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HEALTH SEEKING BEHAVIOUR AND DELAYS IN DIAGNOSIS AND TREATMENT IN PATIENTS REPORTING WITH COUGH OF THREE WEEKS OR MORE TO TUBERCULOSIS UNITS & MICROSCOPY CENTRES IN EAST SIKKIM

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Health Seeking Behaviour in Sikkim

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HEALTH SEEKING BEHAVIOUR AND DELAYS IN DIAGNOSIS AND TREATMENT IN PATIENTS REPORTING WITH COUGH OF THREE WEEKS OR MORE TO TUBERCULOSIS UNITS & MICROSCOPY CENTRES IN EAST SIKKIM

ABSTRACT

The objective of this paper is to study the health seeking behaviour in patients reporting with cough of 3 weeks or more to Tuberculosis Units & Microscopy Centres in East District of Sikkim and to ascertain delays if any in diagnosis and treatment, and to examine the associated factors. A cross sectional survey that included 2 Tuberculosis Units and 4 Microscopy Centres was conducted in East Sikkim from 1.1.2003 to 15.3.2003. A total of 323 patients, reporting to the health facilities, were interviewed using a pre-tested interview schedule.

Median delay was estimated as 32 days, of which 21 were on account of patient delay and 7 days' delay was attributable to health system; 16.7% of them delayed seeking treatment by more than 30 days whereas health system delayed treatment by more than 7 days in 48.9% of them. Over 58% of patients waited for more than 30 days for confirmation of diagnosis.

Factors strongly associated with the patient side delay were use of self–medication (AOR 2.28, P = 0.05), choice of government doctors as first contact point (AOR 2.76, P = 0.022), use of traditional healers (AOR 2.18, P = 0.042) and cost of treatment (AOR 2.52, P = 0.018). Factors associated with health system delay were first contact with private doctors (AOR 33.1, P < 0.001), distance travelled (AOR 2.37, P = 0.02) and cost of treatment (AOR 2.5; P= 0.012).

INTRODUCTION

Tuberculosis is among the top ten causes of global mortality [1].Among infectious diseases, tuberculosis (TB) is the single largest killer of young and adult populations in the world; every year, 8 million new cases (136/lakh population) and 2 million deaths occur due to TB[2]. It kills about 500,000 people each year in India[3]. The country has far more TB cases (2 million new cases in a year[2]) than any other country and accounts for nearly one-third of prevalent cases globally[3]. TB prevalence in India is 8/1000 population (4/1000 bacteriological positive and 4/1000 bacteriological negative but radiological positive cases).[4] Despite the efforts and notification of 1.02 million smear–positive cases under Directly Observed Treatment Short–

course (DOTS), it represented only 27% of the estimated global case load and the rate of progress of case-finding during 1999-00 was no faster than the average since 1994. Now, DOTS programme must recruit an extra 330,000 smear-positive cases each year to reach 70% case detection by 2005.[6] A comprehensive review of the TB programme in India in 1992 found that less than 50% of TB patients received accurate diagnosis and among them, only less than 50% were effectively treated.[3] In response to the World Health Organisation (WHO) recommended strategy of DOTS,[5] the Revised National Tuberculosis Control Programme (RNTCP) was launched in 1993. Access to DOTS is now provided to over 450 million people. Detection rate in DOTS areas is 55-60% of the estimated new infectious cases, which is below the global target of 70%.[7]

Several obstacles impede the expansion of the RNTCP.[8] First, diagnosis and treatment are uncoordinated and inconsistent because many patients initially receive care through the large private health-care sector, pharmacies often sell anti-TB drugs over-the-counter, and TB notification requirements are not strictly enforced. Second, poverty impedes program performance. Many areas lack regular electric supply, limiting the effectiveness of binocular microscopy. Economic hardships and drought cause large-scale migration, reducing treatment completion and cure rates. Third, a patient-centred approach to care—one that actively helps patients by providing them with transportation to health facilities, food, and social support to overcome obstacles to completion of treatment— is not practiced widely in India.[9]

Early diagnosis and prompt initiation of treatment is essential for an effective tuberculosis control programme. Delay in the diagnosis may worsen the disease, increase the risk of death and enhance tuberculosis transmission in the community.[10] Reservoirs for high levels of TB transmission rest predominantly in those with undiagnosed pulmonary disease. The contagion parameter suggests that where TB is endemic, each infectious case will result in between 20 and 28 secondary infections.[11] Strategies aiming to reduce the time between the onset of symptoms and the initiation of effective chemotherapy may impact the infectious duration in the community and thereby reduce the number of new infections.

In India, District Tuberculosis Centre (DTC) is the nodal point for TB control activities. It also functions as a specialised referral centre. The RNTCP guidelines stipulate the establishment of Tuberculosis Unit (TU) at the sub-district level. Each TU is to cover approximately 500,000 population and is to be stationed at Taluk Hospital/Community Health Centre (CHC)/Block Primary Health Centre (BPHC). The diagnostic component (Microscopy Centre or MC) is to be located in Taluk hospital/CHC/PHC and the number of MCs is based on the workload but limited to a maximum of 1/100,000 population.[12]

It has been reported that Sikkim, implementing DOTS strategy on 1st March 2002, has an overall TB prevalence of 10/1,000 population.[13] Anti-tuberculosis treatment facilities largely belong to the public sector. Its booklets, widely distributed, claims that 'every year 2000 cases are detected, more than 140 cases per month' and that 'reported case notification rate of smear positive cases is the highest in the country'.[14]

For a small population of only 5,40,493,[15] Sikkim has five DTCs located at the four District Headquarters and the capital town of Gangtok. Due to its hilly and difficult terrain, most of the conditions as laid down in the guidelines have been given due consideration. In its most populous District of the East district, two TUs, four designated MCs and 4 non-designated MCs (sponsored by the State Government) provide anti-tuberculosis facilities under RNTCP guidelines[14] for the population of about 2,40,000.[15]

Rationale

DOTS strategy stipulates that *early detection of disease should be done in all symptomatic patients reporting to the general health Services with cough of a duration of 3 weeks or more by examination of 3 sputum smears for AFB*".[12]

The magnitude and risk factors for patient and health system delays have been well documented in a number of countries, but are little known in India accounting for nearly 30% of the global tuberculosis burden.[16] This study aims to determine the length of delay between the onset of symptoms and patients' first visit to health care (patient delay), and the length of delay between health care visit and the diagnosis of tuberculosis (health system delay). Identification of the delays in diagnosis and treatment and of factors related to specific types of delays will help tuberculosis control programs and medical providers to target case-finding, diagnosis and treatment efforts appropriately.

Objectives

The overall objective of the study is to understand the health-seeking behaviour of patients reporting cough of 3 weeks or more to **Tuberculosis Units** and **Microscopy Centres** in East District of Sikkim and to analyse delays, if any, in diagnosis and treatment, and their causal factors. Specific objectives are:

- To track the health-seeking behaviour of patients reporting to the Tuberculosis units and Microscopy Centres with 3 or more weeks of cough.
- To measure patient and provider delays of diagnosis and treatment.
- To analyse factors associated with delays in diagnosis and initiation of treatment.

Why do patients delay seeking TB care?

Untreated smear-positive patient may infect on about 10 contacts annually and 20 during the natural history of the disease until death.[17] Delayed diagnosis causes patients to have more advanced disease, more complications and a higher mortality hitting families in the developing world the hardest, particularly because younger active wage-earners are the chief victims of the disease. Diagnostic delay has even greater implications for the millions of patients with pulmonary tuberculosis and co-infection with human immunodeficiency virus (HIV).[18] Delays in diagnosis and start of effective treatment increases morbidity and mortality from TB as well as the risk of transmission in the community.[19,20] Delays in diagnosis of tuberculosis have been reported in both industrialised and developing countries and vary considerably from 6.2 weeks in Australia[21] to 12 weeks in Botswana.[22] and 16 weeks in Ghana.[23]

Factors influencing care-seeking behaviour are multi-layered and complex. In Thailand, for instance, people associated their TB symptoms with HIV/AIDS and delayed seeking treatment for fear of having AIDS.[24] In Kenya, on the other hand, traditional treatment is considered a valid alternative to modern treatment. Initial symptoms such as cough and fever are often overlooked and/or confused with malaria or common cold. Prolonged self-treatment, consultation with the traditional health sector and social stigma are some of the factors associated with increased patient delay.[25] In the Philippines, patients linked TB to alcohol/ tobacco and, thus, delayed seeking treatment for these “harmless” symptoms.[26]

Cultural beliefs about the causes of TB may also influence how people treat their symptoms. In Ethiopia, TB and all other diseases are believed to be caused by imbalances in behaviours or diet and are, therefore, best treated by herbal remedies and “good” foods.[27] A study conducted in South Africa found that there was a strong belief in the community that tuberculosis was the result of breaking cultural rules that demand abstinence from sex after the death of a family member and after a woman has a spontaneous abortion. People believed that traditional healers could only treat the resulting disease. Only when traditional treatment failed did they seek western medicine.[28]

In industrialized nations, researchers have conducted numerous qualitative studies on the health behaviours of immigrant and refugee groups. For Latinos in California, while trust in clinical practices and social connections facilitated treatment adherence, access issues most affected care seeking.[29] Similarly, the presence of social support reduced TB incidence among foreign-born persons in Massachusetts; however, economic and social disadvantages often outweighed protective factors.[30]

Reasons for patient delay appear to be complex and multi-factorial. Inadequate knowledge about TB in the community (cough is not often recognised as a symptom of possible TB), stigma, inaccessibility (public services are either not manned or open only for very short period), cost (loss of work, travel expense, medicine cost, social costs like divorce, children forced to leave school, etc.) and preference for private practitioners are some of the reasons for patient delay. Despite difficulties, many patients do present themselves to the health care system but are not diagnosed early (system delay).[31]

Gender

Although the overall prevalence of pulmonary TB is lower in women, progression from infection to disease is as much as 130% higher in women between the ages of 10 and 44 years, and case fatality rates are 27-41% higher in women and girls between 5 and 24 years of age.[32] These numbers indicate that, while women *may* enjoy some kind of natural protection against TB, it may be offset by biological and sociological vulnerabilities at certain life stages. This may lead to accelerated morbidity and mortality, as well as delays in treatment-seeking and/or differential treatment once they seek help from the health care system. Gender itself is not the cause of morbidity and mortality in TB but is a powerful indicator of disadvantage, a marker of many factors that influence health and utilisation of health services. Health seeking behaviour of people, especially of women, may be influenced by stigma, by making them reluctant to get their sputa examined and shop for diagnosis and treatment, often in places away from their residence.[33]

Sex inequalities can lead to poorer access to health care and delays to diagnosis of tuberculosis in women. In a population-based survey that assessed health-seeking behaviour in adults with long-term cough, women took more health care actions than men, but chose less qualified providers and reported lower health expenditure per visit. Delay before seeking hospital treatment was longer for women (41 days) than men (19 days; p=0·04), and more men (27, 36%) than women (14, 14%; p=0.0006) reported giving a sputum sample at hospital.[34] Delays in diagnosis were also more evident in women than men. A study in Vietnam has shown that women with pulmonary tuberculosis are diagnosed on average 2 weeks later than men because of delays from the healthcare provider.[35] Similarly, a study in Nepal showed that women were diagnosed a month later than men.[36]

Stigma

Numerous studies have shown that patients' denial or hesitation to disclose their TB status to family or friends arose out of fear of being socially ostracized. A vast majority (77%) of

Vietnamese refugees in New York believed that the community would fear and avoid persons with TB.[37] A study conducted of women with tuberculosis in Bombay (now Mumbai) indicated that they were worried about rejection by husband, harassment by in-laws, dismissal from work, reduced chances of marriage for unmarried women, and difficulty in keeping the condition a secret. [38] In Thailand, community's strong belief about TB transmission through eating and drinking seemed to have induced anxiety and stigma among female HIV negative TB patients; these women were not allowed to join social events when people came to know that they had tuberculosis.[24] In Colombia, stigma, poor service quality and culture-based explanation are found to act as strong barriers to early diagnosis.[39] Similarly, in Mexico, patients blamed social consequences of stigma for their long delays in seeking care and poor treatment adherence.[40] In Honduras too, fear of losing family and friends led some TB patients to report preferring death to social rejection.[41] Studies in India have shown that married women delayed seeking treatment or hide their diagnosis from their husbands out of fear of being deserted.[38]

Health system factors

Studies have sought to establish whether the delay in diagnosis is due to delay in seeking care or due to providers' inability to diagnose promptly. Commonly, the delay is in receiving a diagnosis rather than in seeking care. Even in countries where TB treatment is offered exclusively by the public sector, patients tend to be under private care for a considerable length of time before TB is suspected and patients referred to the TB service. In Kenya, 90% of TB suspects had attended a health care facility (private and/or public) for an average of 5 times, yet 65% had neither a chest radiograph taken nor their sputum examined.[42] In India, the first source of help for a majority (86%) of patients is private practitioner and the median delay in diagnosis is found to be about 3 weeks and 2 weeks respectively among urban and rural patients after they sought help at private clinics.[43] About 33% of urban patients and 36% of rural patients were not diagnosed even after 4 weeks of seeking help. Patients who first consulted private practitioners experienced a significantly longer 'doctor-delay' than patients who first consulted governmental health services.[16] Similarly, only 22% of patients were diagnosed at the health facility where they sought care first and nearly half of them had to visit 3 or more health facilities before the diagnosis was made. In Viet Nam too, patients who had first turned to a private pharmacy or a private physician were significantly more likely to have a long provider delay compared to people who had first turned to the NTP.[44] The potential positive impact of private sector involvement is clearly demonstrated in a unique public-private mix project operated by a private hospital in Hyderabad City in South India. The mean delay in diagnosis after seeking help among patients reporting to the public sector DOTS

programme was half as much again as that among patients of that project (7 weeks and 5 weeks respectively). [45]

METHODOLOGY

Selection of subjects

This study used a cross sectional survey in east Sikkim district during January – March 2003. The district has 2 Tuberculosis Units and four Microscopy Centres rendering services under the RNTCP. Daily about 500 patients attend outpatient facilities of all institutions with TUs and MCs. With 2% of them are expected to have cough for 3 weeks or more,[12] number of patients qualifying as study subjects would be around 10 and in 40 working days, it would be possible to recruit 400 subjects. Patients reporting symptoms of cough for 3 or more weeks and undergoing investigations (clinical, laboratory & radiological) qualified as study subjects. All those reporting from 1.1.2003 to 15.3.2003 were recruited after obtaining the informed consent.

Dependent variables

Dependent variables for the study were patient delay, health system delay and total delay. Their definitions are given under:

*Patient delay***.** Time interval between appearance of cough and 1st contact with a medicalfacility {doctors/PHC/sub-centre/multipurpose workers of public, private or any system)

*System delay***.** Time interval between 1st contact with the facility and confirmation of diagnosis and initiation of anti-tuberculosis treatment.

*Total delay***.** Sum total of patient and system delays

Independent variables

Age. A recent Indian study has shown that patients aged 45 years or above are likely to have longer patient delays.[16] Age, as informed by the patients, was recorded in compete years. For analysis age was dichotomised as below 45 years and 45 years or more.

Sex. Studies carried out in countries such as Vietnam[35] and Nepal[36] have shown that women were more likely to experience longer patient as well as health system delays.

Marital status. Marital status has been documented as married or single. Single includes unmarried, divorced, widowed and separated.

Household size. Of all the factors tested in a study conducted in South Africa only the household size was associated with longer patient as well as service provider delay.[60] Actual number of

people who ate from the same kitchen. Participants were categorised into two groups - 1 to 5 members and > 5 members.

Literacy. Education is found to be a factor influencing delay.[58,59] Information on education was collected as never attended school, less than primary school, primary school competed, middle school completed, secondary school completed and higher secondary and above. Education status was finally coded and analysed, as never attended school and those who have had some form of schooling.

Occupation. A study in Ethopia has found that some category of patients such as farmers, soldiers, house workers and housewives had increased risk compared with students.[61] Information on the type of occupation was collected and patients were categorised into unemployed, daily wagers, farmers, housewives, students, and others (businessmen, contractors and office goers).

Economic status. A study in Philippines has shown that low family income was correlated with no intention of seeking health care and intention to self-treatment among TB patients. Information was collected from the patients.[62] Total monthly income was then divided by household size to arrive at per capita monthly income. Subjects were classified into three categories – those falling within 33rd percentile, those between 34th & 67th percentile and those whose income was above 67th percentile.

Backwardness. Subjects were also classified into 4 groups - Scheduled Tribes (ST), Scheduled Castes (SC), Other Backward Classes (OBC) and Other Community (OC) (upper caste and those from other parts of India). It was done to differentiate social groups in the study population.

Alcohol use. Prevalence of alcohol use is quite high (49%) in Sikkim.[46] Studies have found that use of alcohol is a factor associated with delays in diagnosis and treatment of TB.[16,60] Alcohol user were categorised as abstainer, present and past alcohol user.

Distance of TU/MC. Studies in places like India[16] and Ethiopia[57] have found that distance of residence from the health facility to be a factor associated with both patient delay and health system delay. Two categories - 0-5 km and > 5 km were considered.

Mode of transport. Distance alone may not be able explain inaccessibility considering the hilly terrain of the area in which the study was conducted and the unavailability of motor able roads uniformly for all. Three categories - walking, vehicle and a combination of both – were considered in this study.

Cost of treatment. Under the DOTs strategy tuberculosis diagnosis and treatment are to be free of charge to the patient,[3] however a patient-centred approach to care—one that actively helps patients by providing them with transportation to health facilities, food, and social support to overcome obstacles to treatment— is not practiced widely in India.[9] Total expenditure incurred on the current episode of illness was computed by adding expenditures on transportation, medicines, investigations and consulting fee. Subjects were categorised into those spending less than 33rd percentile, between 34th & 67th percentile and more than 67th percentile.

Knowledge. Interview schedule contained 13 closed questions about causes, symptoms, diagnosis, and treatment of TB and anti-TB facilities available in the state. A summary indicator was arrived at giving due weightage to answers related to sputum examination and cough of three weeks. Subjects were classified into those who fell below 33rd percentile, between 34th & 67th percentile, and more than 67th percentile as poor, moderate or good knowledge.

TB status. Information was collected on the type of investigations advised at the TUs/MCs, whether investigations were carried out or not, date of the investigations, date of announcing the results, and investigation outcomes. Information was based on TU/MC records. Patients were categorised as whether they had confirmed pulmonary TB or not.

Health seeking. Actions taken by the subjects to relieve themselves of cough symptom were chronologically recorded as reported by the subjects. Information included type of health seeking, days of consultation, type of care provider, and referral practices followed.

Reasons for delay. Information was collected from both providers and subjects through open-ended questions.

Data collection

A pre-tested interview schedule with two parts (Appendix II) was used to collect the required data. The first part sought information on (1) scio- economic and demographic particulars, (2) expenditure on current illness, (3) knowledge about TB, (4) health seeking behaviour for cough of 3 or more weeks, and (5) reasons for delay, if any.

The investigator, based on records of the TUs and MCs after the subjects had undergone the investigations, filled the second part of the schedule. Second part included details on (1) date of advice of investigations, (2) results of sputum examinations and dates of results, (3) X-ray results and dates of results, (4) confirmation of diagnosis and start of treatment, and (5) delays, if any, and reasons as stated by the providers.

Interviews were conducted at 6 health facilities in the district simultaneously. Two graduates with an experience of having worked in the Health Department, Government of Sikkim, after receiving 2-day training, carried out the interviews at 2 TUs while at the MCs, Medical Officers in charge of the units, after a day's training, were given the responsibility to administer the first part of the interview schedule. The 2 TUs were under direct supervision of the principal investigator, who spent alternate days at the 2 TUs. MCs were visited once a month on Sundays, when two completed interview schedules were selected randomly to revalidate the interviews. Second part of the interview was completed exclusively by the principal investigator with the help of the two investigators at the TUs.

Crosschecking with the relatives of the subjects accompanying the subjects confirmed all information on socio-economic and health seeking behaviour. Wherever possible, past prescriptions were also examined to validate the information.

Data analysis

Data was cleaned and entered into Excel spread sheets and analysed using SPSS (Windows 11) software. Patient delay was dichotomised using a cut off value of 30 days and health system delay was dichotomised using a cut-off value of 7 days. In the absence of any international/national norms for 'acceptable delay', this study used subjective criterion based on presence or absence of symptoms.[16,21,47,48] Univariate, bivariate and multivariate analyses were carried out. Statistical comparisons between groups were made using the c^2 test with statistical significance taken at P £ 0.05.

RESULTS

Socio-demographic profile

All 323 eligible subjects (41.2% women) reporting at 2 TUs and 4 MCs in East Sikkim were interviewed; mean age was 35.1 years (range 10-80) with 71% below 45 years. Average household size was 5.7 (range 1 - 12) and household income was Rs. 2,692/- (range Rs. 100 — 5,000). They travelled 19.1 km (median 5 km and range 1 - 150 km) to reach the TU/MC. They incurred a total expenditure of Rs. 546/- per episode (median Rs. 200/- and range Rs. 0 - 5120). One-third of the subjects were illiterate while 26.3% were scheduled tribes, 9.3% scheduled caste and 32.8% other backward classes. 21.7% were housewives, 19.5% students, 14.6% farmers, 11.5% daily wagers and 9.9% unemployed; 53.3% were married.

Tuberculosis status and health seeking behaviour

Table-1 gives the TB status of the subjects. Chronologically recorded health seeking actions of the subjects were analysed systematically. About 21% of the subjects indulged in one other action prior to reporting to the TC/MC; 39.6% indulged in 2 actions, 26.3% three, 11.5% four and 1.5% experienced five. Over 60% indulged in self-medication as their first action while 18.9% consulted government health providers, 10.5% private providers, 8.7% traditional healers, 1.2% government multi purpose health workers and 0.3% practitioners of other systems (Tibetan) of medicine. None of them came to TU/MC as their first action.

Table-1. Distribution of subjects according to type of TB

Type	Total	Female	Male
Pulmonary TB positive	108 (33.4)*	36 (27.1)	72 (37.9)
Pulmonary TB negative	215 (66.6)	97 (72.9)	118 (62.1)
Total	**323(100)**	**133(100)**	**190(100)**

** Figures in parentheses are column percentages.*

First contact point in the formal health system

First contact point for 71.2% subjects was a government doctor while 26% consulted private doctors, 1.5% government multipurpose health workers and 1.2% practitioners of alternative (Tibetan) medicine. Table-2 reports the results. Larger proportion (27.8%) of women chose to consult private doctors compared to men (24.7%).

Self medication

Over 68.4% (70.5% men and 65.4% women) of the subjected indulged in self medication first. A vast majority (89.2%) took it at least once for their cough while others took it more than once. Self-medication was used on as many as 246 occasions; cough syrup was used on 52.5% occasions, home remedies 45.9%, and antibiotics 1.6% (Table-3).

Table-2. First formal contact point in the health system

Contact	Total	Female	Male
Government doctor	230 (71.2)*	94 (70.6)	136 (71.6)
Private doctor	84 (26.0)	37 (27.8)	47 (24.7)
Govt.MPHW	5 (1.5)	1 (0.8)	4 (2.1)
ISM&H practitioner	4 (1.2)	1(0.8)	3 (1.6)
Total	**323**	**133**	**190**

* Figures in parentheses are column percentages.

Table-3. Type of self medications

Type	Total	Female	Male
Cough syrups	129 (52.5)*	41 (42.3)	88 (59.1)
Home remedies	113 (45.9)	55 (56.7)	58 (38.9)
Antibiotics	4 (1.6)	1 (1.0)	3 (2.0)
Total	**246**	**97**	**149**

* Figures in parentheses are percentages.

Traditional healers

Traditional healers were approached by 22.3 % (20.5% men and 24.8% women) of the participants prior to reporting to the TU/MCs. 20.8 % of the participants used traditional healers only once and 1.5% more than once.

Referrals

Table-4 provides an account of the referral mechanism before reaching the TU/MC. The figures are based on the subjects' information. As it can be seen from the table, 68.4% came on their own, 13.3% were advised by their relatives and friends, 3.7% were referred by private doctors, 13.9% by government doctors and a mere 0.6% by Multipurpose health workers. Self-reporting was higher (72.1%) among men compared to women (63.2%).

Table-4. Referred mechanism to reach a TU/MC

Referred by	Total	Male	Female
Self reported	221 (68.4)*	137 (72.1)	84 (63.2)
Govt. doctor	45 (13.9)	28 (14.7)	17 (12.8)
Friends & Family	43 (13.3)	16 (8.4)	27 (20.3)
Private Doctor	12 (3.7)	7 (3.7)	5 (3.8)
Govt. MPHW	2 (6)	2 (1.1)	0 (0.0)
Total	**323**	**190**	**133**

** Column percentages*

Delays

Total delay in seeking treatment from TU/MC is reported in Table-5. Median total delay to confirm the diagnosis was 32 days (range 21 - 367) with a mean of 43.4 days; 58.2% of the subjects experienced a total delay of at least 30 days. The delay exceeded 60 days for 41.3% of them and for 6.5%, it exceeded even 90 days. However, the delay between diagnosis and treatment was negligible (mean 0.53 days and range of 0 – 9 days).

Patient Delay

The median patient side delay was 21 days (range 2 – 365 days) with a mean of 27.7days; 16.7 % of them delayed by more than 30 days to seek care from the health system.

Health system delay

The median delay by health system was 7 days (range 1 – 193 days) with a mean of 14.7 days; 48.9% of the patients experienced a health system delay of more than 7 days while others received the treatment within 7 days of approaching the TU/MC.

Table-5. Delay in seeking treatment from TU/MC

	No. of days delay in diagnosis			Delay in starting treatment
	Patient N = 323	Health system N = 322	Total N = 322	N = 322
Mean	27.7	14.7	43.4	54.13
Median	21.0	7.0	32.0	33.0
Standard Deviation	35.3	22.3	44.7	54.55
Minimum	2	1	21	21
Maximum	365	193	367	367

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Table-6. Self reported reasons for the delay

Reason for the delay	Total	Male	Female
Cough not serious	100 (31.0)*	65 (34.2)	35 (26.3)
TU/MC far away from residence	52 (16.1)	33 (17.4)	19 (14.3)
Dependent (too young/old/severely ill)	28 (8.7)	11 (5.8)	17 (12.8)
Too busy and no time	51 (15.8)	31 (16.3)	20 (15.0)
Went to private doctor	12 (3.7)	5 (2.6)	7 (5.3)
No money	24 (7.4)	18 (9.5)	6 (4.5)
TU/MC closed	4 (1.2)	1 (0.5)	3 (2.3)
None	52 (16.1)	26 (13.7)	26 (19.5)
Total	**323**	**190**	**133**

* Column percentages in brackets

Reasons for delay

Subjects were asked about the reasons for the delay in seeking and receiving the treatment. Table-6 provides the results. About a third thought that their cough was not serious; they were not able to distinguish between common cough due to cold and cough leading to TB. Distance was a factor for 16.1% and 8.7% relied on their parents/relatives or friends, as they were too young/old or severely ill; 3.7% reported that they went to private doctors. Lack of monetary resources was the reason behind the delay for 7.4% while 1.2% stated that the TU/MC was closed when they approached. One-sixth of the subjects could not attribute any reason for the delay.

Determinants of total (patient and provider side) delay are reported in Table-7. Those who resorted to self-medication, those whose cost of treatment exceeded Rs. 400/- and present alcohol users experienced significantly higher delay compared to other groups. Other factors such as community status, monthly per capita income, occupation, size of household, distance of residence from the health facility were not statically significant.

Table-7. Determinants of delay

Determinant	Patient Delay		Total	P-value (c^2)
	1-30 days	≥31 days		
No self medication	52 (51.0)*	50 (49.0)	102 (100)	0.02
Self medication	82 (37.3)	138 (62.7)	220 (100)	
No alcohol use	86(41.0)	124 (59.0)	210 (100)	0.03
Present alcohol user	11 (26.8)	30 (73.2)	41 (100)	
Past alcohol user	37 (52.1)	34 (47.9)	71 (100)	
Cost of treatment				
< Rs.100	72 (51.4)	68 (48.6)	140 (100)	< 0.001
Rs. 100 - 399	38 (48.1)	41 (51.9)	79 (100)	
[3] Rs.400	24 (23.3)	79 (76.7)	103 (100)	11 (26.8)

** Row percentages*

Patient delay

Table-8 reports the factors that caused the delay. Self–medication, choice of first health system contact, use of traditional healers and alcohol use were the factors strongly associated with patient side delay of more than 30 days. Higher proportion of those who indulged in self medication experienced a delay of more than 30 days compared to those who did not resort to self medication. The difference was statistically significant (P = 0.02). The delay was significantly (P = 0.02) higher among those who consulted government health care providers compared to others. Similarly, the delay was more for those who used traditional healers and currently used alcohol. Illiterates and older people experienced higher delay; however, the result was not statistically significant (Annex Table-A1). Other socio demographic factors too were found to be insignificant.

Health system delay

Table-9 brings out the results concerning the determinants of health system delay. Health system delay was strongly associated with the choice of the first health system provider. A greater proportion of participants, who had been to a private doctor first, experienced health system delays compared to those who went to government health providers. Those who approached government providers had lesser health system delay compared to those who

visited private or other providers. Health system delay was higher for those who did not use self medication and traditional healer (non-significant) and who used alcohol in the past. Cost of treatment had a direct bearing on the delay - more the cost higher the delay. Mode of transport to reach the TU/MC too significantly contributed to health system delay. Other factors contributing to the delay were distance from the TU/MC and socio demographic factors such as sex, age etc. (Annex Table-A2).

Table-8. Determinants of patient side delay

Determinant	Patient Delay		Total	P-value
	1-30 days	≥ 31 days		
No self medication	92 (90.2)*	10 (9.8)	102 (100)	c^2
Self medication	177 (80.1)	44 (19.9)	221 (100)	0.02
Government provider	189 (80.4)	46 (19.6)	235 (100)	Fisher's Exact Test
Private/other provider	80 (90.9)	8 (9.1)	88 (100)	0.02
No traditional healer	217 (86.5)	34 (13.5)	251 (100)	c^2
Traditional healer	52 (72.2)	20 (27.8)	72 (100)	0.007
No alcohol use	177 (83.9)	34 (16.1)	211 (100)	c^2
Present alcohol user	29 (70.7)	12 (29.3)	41 (100)	0.045
Past alcohol user	63 (88.7)	8 (11.3)	71 (100)	

** Row percentages*

Multivariate analysis

Multiple logistic regression was considered because the dependent variables (patient and health system delay) were binary variables. Independent variables were age, sex, marital status, literacy, occupation, economic status, community status, alcohol use, distance from TU/MC, mode of transport, cost of treatment, knowledge about TB, TB status, use of self-medication, use of traditional healer and the choice of first health system provider.

Patient delay

Results of the multivariate analysis concerning patient delay are given in Table-10. Longer patient delay was associated with initial consultation with government provider (AOR 2.76 and 95% CI 1.15 - 6.62, P = 0.022), self-medication (AOR 2.28 and 95% CI 1.0 - 5.18, P =

0.05) and going to traditional healer (AOR 2.18 and 95% CI 1.03 - 4.61, P = 0.042). Longer patient delay was also associated with cost of treatment (AOR 2.52 and 95% CI 1.17 - 5.38, P = 0.018).

Health system delay

Table-11 gives the results concerning the multivariate analysis of health system delay. Longer health system delay was associated with initial consultation with private provider (AOR 33.1 and 95% CI 13.44 - 81.49, P = < 0 .001) and distance travelled (AOR 2.37 and 95% CI 1.12 - 4.99, P = 0.02). Longer health system delay was also associated with cost of treatment (AOR 2.5 and 95% CI 1.22 - 5.128, P = 0.012). Longer health system delay was also associated with the community status of the participants; Scheduled Castes and those belonging to other backward class experienced longer delays.

Table-9. Determinants of health system delay

Determinant	Patient Delay		Total	P-value
	1-7 days	≥ 8 days		
Government provider	154 (65.8)*	80 (34.2)	234(100)	Fisher's Exact Test
Private/other provider	10 (11.4)	78 (88.6)	88 (100)	< 0. 001
No self medication	34 (33.3)	68 (66.7)	102 (100)	c^2
Self medication	130 (59.1)	90 (40.9)	220 (100)	< 0.001
No traditional healer	120 (48.0)	130 (52.0)	250 (100)	c^2
Traditional healer	44 (61.1)	28 (38.9)	72 (100)	0.061
No alcohol	107 (51.0)	103 (49.0)	210 (100)	c^2
Present alcohol user	29 (70.7)	12 (29.3)	41 (100)	0.006
	28 (39.4)	43 (60.6)	71 (100)	

** Row percentages*

Discussion

The Revised National Tuberculosis Programme, adopting the WHO recommended strategy of DOTS, recommends that a person with cough of more than 3 weeks' duration should have

a sputum test done for early diagnosis and treatment of TB. In the present study, median and mean delays were 32 days and 43.4 days. Out of this, patient delay was 21 and 27.7 days and health system delay was 7 and 14.7 days. Other studies found the median delay as 2 months (total), 20 days (patient) and 23 days (health system).[16] The delay was 12 weeks (total), 3 weeks (patient) and 5 weeks (health system) in Botswana[49] and 9.9 weeks (total), 3 weeks (patient) and 7 weeks (health system) in Vietnam.[44] Figures reported by the present study are better because the DOTS (RNTCP) strategy was introduced to Sikkim only in March 2003. Also, Sikkim is a small state and the study District has two TUs,, 4 MCs under RNTCP and 4 non designated MCs under the state Government to cover a small population of 2, 44, 000.

Table-10. Multivariate analysis of patient delay determinants

Risk factors	Adjusted Odds ratios (AOR)	95% CI	P value
Male	1		
Female	1.3	0.52 - 3.25	0.57
< 45 years	1		
> 45 years	0.88	0.38 - 2.06	0.781
Private provider	1		
Government provider	2.76	1.15 - 6.62	0.022
No self medication	1		
Self-medication used	2.28	1.0 - 5.18	0.05
No traditional healer	1		
Traditional healer	2.18	1.03 - 4.61	0.042
Cost of treatment (Rs.)			
< 100	1		
100 - 399	1.2	0.50-2.29	0.689
≥400	2.52	1.17-5.38	0.018
Community status - Others	1		
Other Backward Classes	2.22	0.88 – 5.00	0.09
Scheduled Caste	1.48	0.46 - 4.83	0.51
Scheduled Tribes	1.5	0.64 - 3.55	0.35

Though median and mean delays are less compared to figures from other high-burden countries, it must not be overlooked that a sizeable (58%) group of patients had to wait for more than 30 days before their diagnosis could be confirmed, 16.7% had a patient delay of more than 30 days and 48.9 % had a health system delay of more than 7 days. The study done in south India with similar cut-off of 30 and 7 days had 29% and 69% of its participants with longer patient delays and health system delays[16]. However, the South Indian study was conducted before DOTS implementation and participants were TB patients. In fact, majority of the studies included patients diagnosed as TB and therefore, are not comparable with this study. Nevertheless, the fact that the data found that those with TB did not differ from those who had cough due to other cause makes the study results comparable with and complementary to other studies of delay.

In this study, the choice of first health system provider was strongly associated with both health system and patient delays. Majority of the patients chose government health provider as their first health system provider but a substantial portion (26%) turned to private providers. An overwhelming 88.6% of those seeking services from private and other formal providers experienced a health system delay of more than 7 days compared to 34.2% of those sought care from government providers. However, it could be an overestimate indicated by the fact that the proportion of patients with a patient delay of more than 30 days was only 9.1% compared to 19.6 % of those patients seeking government services. In all probability the patients are going to private doctors early, may be even earlier than the 21 days and thus causing an under estimation of patient delay and an overestimation of health system delay. Caution must also be called, as the sample does not include cough symptomatic who have confirmed their diagnosis in the private sector. However long health system delay also indicates that patients from the health system are being lost to self-medication and traditional healers as depicted in the table showing the patterns of health seeking behaviour. In this study the group of private doctors and others, though in very small numbers, also included doctors from the army and other organisations involved in building dams, roads etc and practitioners of Tibetan medicine. Long health system delays in patients turning to private doctors and other health system providers, not involved directly with the Tuberculosis Programme, as first contacts of the health system suggests that there are no formal referral routes between private and public providers and services such as the army and the government set-ups responsible for the TB programmes[3]. The concept of private public mix though successfully exemplified in Hyderabad[45] and Kerala[50] still seem to be non-existent in these regions, particularly considering that the private sector is in a nascent stage and needs to be groomed to address public health problems too.

Table-11. Factors associated with health system delay

Risk factors	Adjusted Odds ratios (AOR)	95% CI	P value
Male	1		
Female	0.75	0.33 - 1.73	0.51
Age: <45 years	1		
> 45 years	1.08	0.48 - 2.41	0.84
Govt Provider	1		
Private provider	33.1	13.44 - 81.49	< 0.001
No self medication	1		
Self-medication used	0.17	0.09 – 0.34	< 0.001
No traditional healer	1		
Traditional healer	0.69	0.33 - 1.45	0.33
Cost of treatment (Rs.)			
<100	1		
100-399	1.853	0.862 - 3.986	0.114
≥400	2.501	1.220 - 5.128	0.012
Distance: 1-5 km	1		
> 5 km	2.37	1.12 - 4.99	0.02
Community status - Others	1		
ST	0.753	0.335 - 1.94	0.492
SC	3.73	1.231 - 11.301	0.02
OBC	2.29	1.080 - 4.855	0.031

Likewise, self medication was also a factor found to be strongly associated with the risk of long patient delay and overall total delay. Studies carried out in vastly diverse settings like Vietnam[35] and the U.S.A[51] have shown that self-medication predicts delays in diagnosis and treatment of tuberculosis. Self-medication in this study was found to be the preferred choice of first health seeking action for 60.4 % of the patients and was used by as many as 68% of the patients at one time or the other on as many as 246 occasions. Cough syrups were used in 52.5% of the occasions throwing some light to the problem of over the counter sale of

drugs. Other studies have found pharmacies to be week links in the referral systems for tuberculosis and risk factors for longer delays.

The role of the traditional healer in the control tuberculosis has to be seen in the light of the fact that they have other socio-cultural and religious externalities, which may be beneficial to the communities concerned. This study too like many others that were conducted in neighbouring Nepal[36] and Africa[52-54] found an initial visit to a traditional healer to be a significant risk factor for patient delay. Most tuberculosis programme interventions targeted towards traditional healers in the state seem to be in the form of I.E.C. (information, education and communication) materials that discourage the use of traditional healers, while numerous models from high burden countries show that they can be utilised in a more productive manner in tuberculosis control[55]. The World Bank too reported that traditional healers could be important potential public health providers of essential clinical services if governments give them appropriate training, information and incentives[56].

While exploring the reasons for delays, the study could not find any association with most of the socio-demographic factors; past studies have found that older age was associated with longer delays.[16,48] This study too found that older age people experienced patient delay of more than 30 days; it statistically insignificant though. Other studies found factors such as knowledge,[57,53] literacy,[58,59] and socio economic status influenced delay in seeking TB. Yet, this study like the one in Lusaka[48] found no such significant relationship.

Distance travelled, as in the south Indian study, was associated with longer health system delay. Mode of transport too influenced the delay; patients using vehicles had higher health system delay. This is because they had to come from distant places. Those exhibiting conventional risks for TB like alcohol use running the risk of longer patient delay were most quickly diagnosed by the health system as shown in many other studies[60].

Studies in Vietnam[35], Zambia[52] and Nepal[36], which has socio-cultural similarities to that of India and more so with the region in which the study was conducted, found that women were more likely to have longer patient as well as health system delays. In this study, women experienced longer total and patient delays compared to men. Though not significant, it cannot be ignored that women had longer patient and total delay. While it is seen that health-seeking behaviour does seem to be the most important predictor for patient delay, women and men have very different health seeking behaviours and reasons for delay, in most instances it being more difficult for the women. While self-medication was quite extensively used and more men in the study did resort to it, it is interesting to note that while a higher proportion of men used cough syrups women had to resort to home remedies - suggestive of

differences in access to care outside the four walls of one's home. While more men thought the cough was not serious and came late more women were delayed because they had to depend on others to access health care. Self reported referral patterns too show differences that might be adversely affecting the women's access to health care. While more men self reported, more women had to depend on relatives and family. A higher proportion of women went to private and traditional healers as compared to men who went to government hospitals. These differences in health seeking behaviour indicate very different underlying reasons for delay, that gender specific barriers exist and impair effective systems of health care.

Another important aspect of delays in diagnosis is the economic implications, which invariably affects the poorer sections hardest. This study found significant association between the amounts spent on the illness and health system delay and total delay. This has to be viewed in the context that while under the DOTs strategy tuberculosis detection and diagnosis is to be completely free a patient-centred approach to care—one that actively helps patients by providing them with transportation to health facilities, food, and social support to overcome obstacles to treatment— is not practiced widely in India.[9]

In the multivariate analysis, community status was associated with longer health system delay. Participants belonging to the scheduled caste and other backward classes were disadvantaged compared to others. However, another disadvantaged group, Scheduled Tribe, did not show any such association. Figures may be confounded by factors such as occupation and economic status and needs further exploration and analysis. Other findings in the multivariate analysis were consistent with those found in the bivariate analysis.

The strategy adopted by DOTs is a one of passive detection of cases and it is commendable to see that more than 68% of the study population reported that they had come to the health facilities on their own. But the extremely low percentage of less than 1% of patients reporting that they had been sent to the Tuberculosis Units or microscopy Centres by the multipurpose health workers is a disturbing trend if at all true.

Another area of concern may be the 1.2% of the participants that reported that they had come to the TUs/MCs but that the health facilities were closed due to the ongoing festival. The figure while contributing to the over estimation of patient delay may also be a reflection of the number of patients the tuberculosis programme may be losing due to closure of the health facilities, especially during long holidays during festivals or otherwise. In view of the numerous government holidays during which these health facilities remain closed for diagnostic services the trend could be of concern if mechanisms to hold the patients are not in place.

Limitations

Recall bias with reference to timeliness and chronology of health seeking actions experienced may have been a limitation of the study. However every effort has been made to reduce this bias to a minimum by having the interviews taken as the patients reported to the respective health facilities. The study having been conducted in institutional settings rendering services as per the RNTCP guidelines does not include patients with cough of three weeks or more who have confirmed their diagnosis in the private sector or those who might not have sought treatment at all. The cross-sectional study design used for the study with its inherent limitation of the lack of temporality is unable to prove causal association and is only capable enough to generate hypothesis.

Conclusion

The confirmation of TB diagnosis can be delayed when patients postpone seeking appropriate care until much after the onset of symptoms (patient delay) or when health providers take more time than required to diagnose patients seeking care (health system delay). In this study, the median delay was less than that found by other studies. However, a big chunk of the patients had to wait for at least 30 days to confirm their diagnosis.

Although most patient characteristics were statistically insignificant as factors associated with longer delay, health seeking behaviour seemed to be a strong predictor for delays in confirmation of diagnosis. The choice of private practitioners as the first recognised health system provider was associated with a longer health system delay. The use of self-medication and traditional healers were strongly associated with longer patient delay.

Other areas of concern were the poor involvement of multipurpose health workers in activities related to tuberculosis control, the lack of formal referral routes between private and public providers and the possibility of delay occurring due to unavailability of diagnostic services especially during prolonged periods of government holidays. Treatment cost was also associated with the delay implying an adverse economic impact especially for weaker sections of the population. While health-seeking behaviour was found to be a strong predictor of delays, interventions intended to influence behavioural change may have to be targeted differently for men and women.

Recommendations

Awareness and capacity building

- Increasing awareness about the signs and symptoms of TB among the general population
- Capacity building amongst the weaker sections of the population to enable them to seek appropriate help at the appropriate time at the appropriate place

Revamping of referral pathways

If the Government intends to remain the main provider of anti tuberculosis services it has to strengthen its referral system to enable its services to reach one and all. Its multipurpose health workers intended to be the first contacts between the formal health care system and the community need to be retrained and reoriented to play a more meaningful role in the referral of suspected tuberculosis patients.

Private practitioners, practitioners of other forms of medicine and health providers in services such as the army and private companies need to be included in the referral mechanisms at the earliest. Providers not recognised by the formal health systems such as traditional healers have to be taken in confidence, made aware of the enormity of the problem and encouraged to be a part of the referral system.

Private-public mix

It must be realised that the government alone will not be able to fight the menace of tuberculosis and that tuberculosis control needs to involve all health care providers and that the involvement needs to be recognised at a formal level. Partnerships with the private practitioners need not only to be recognised and formalised but also encouraged.

Regulation of over-the-counter sale of drugs

While efforts to encourage utilisation of the services provided by generating awareness and influencing health-seeking behaviour are imperative if tuberculosis is to be controlled, regulation of over the counter sale of drugs may have other benefits too. Sale of drugs without prescription needs urgent regulation and implementation of the regulation.

Continuity of diagnostic services

Taking into consideration that long and many holidays due to festivals and other activities is a way of life in these parts of the world a mechanism has to be in place that ensures a continuity in diagnostic services even during such holidays.

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Table-A1. Patient delay and its determinants

Patient Characteristics		n	% of patients with delay ≥ 31 days	P value
Male		28	14.70%	0.29
Female		26	19.50%	
Age≥ 45 years		36	15.50%	0.407
Age>45 years		18	19.80%	
Illiterate		24	22.40%	0.058
Literate		30	13.90%	
Married		31	18.00%	0.552
Single		23	15.20%	
Expenditure on illness:	<Rs.100	19	13.60%	0.174
	Rs.100-399	12	15.00%	
	≥ Rs. 400	23	22.30%	
House size: 1-5 members		23	14.60%	0.371
≥ 6 members		31	18.80%	
P/C income: <Rs.250		18	18.80%	0.439
Rs.251-Rs.599		22	18.50%	
≥ Rs. 600		14	13.00%	
Knowledge: Poor		16	19.50%	0.216
Moderate		27	18.90%	
Good		11	11.20%	
Occu:Unemployed		9	28.10%	0.113
Daily wager		7	18.90%	
Farmer		9	19.10%	
Housewife		14	20%	
Student		4	6.30%	
Others		11	11%	
Community: ST		16	18.80%	0.448
SC		6	20%	
OBC		20	18.90%	
Others		12	11.80%	
PTB status: PTB Positive		20	18.50%	0.532
PTB negative		34	15.80%	

Table-A2. Health system delay and its determinants

Patient Characteristics		n	% of patients with delay ≥ 7 days	P value
Male		95	50	0.734
Female		63	47.7	
Age ≥ 45 years		114	49.1	0.534
Age>45 years		44	48.9	
Illiterate		50	47.2	0.638
Literate		108	50	
Married		86	50	0.739
Single		72	48	
Distance to TU/MC	1-5 kms	78	44.6	
	≥6 kms	80	54.4	0.093
per capita income:	<Rs.250	46	48.4	0.971
	Rs.251-Rs.599	58	48.7	
	_Rs. 600	54	50	
Occu:Unemployed		14	43.7	0.814
Daily wager		19	51.4	
Farmer		22	47.8	
Housewife		39	55.7	
Student		28	44.4	
Others		36	48.6	
Knowledge: Poor		40	49.4	0.183
Moderate		63	44.1	
Good		55	56.1	
TB status: PTB Positive		59	54.6	0.159
PTB negative		99	46.3	
Community: ST		39	45	0.534
SC		18	60	
OBC		54	50.9	
Others		47	46.5	

Table-A3. Patient delay and risk factors : Multiple logistic regression analysis

Risk factors	Odds ratios	95% CI	P value
Sex: Male	1		
Female	1.3	.523-3.245	0.57
Age: <45 years	1	.	
> 45 years	0.88	.38 -2.06	0.781
Choice of first health provider			
Private provider	1		
Govt Provider	2.76	1.15- 6.62	0.022
No self medication	1		
Self-medication used	2.277	1.000 5.183	0.05
Trad Healer (No)	1		
Trad healer (Yes)	2.179	1.029- 4.614	0.042
Community status: Others	1		
Other Backward Classes	2.221	.883-5.584	0.09
Scheduled Caste	1.482	.455-4.831	0.514
Scheduled Tribes	1.502	.635-3.554	0.354
Single	1		
Married	1.02	.472-2.221	0.952
Walking	1		
Vehicle	0.718	.284-1.814	0.484
Combination of both	1.476	.409-5.320	0.552
Distance: 1-5kms	1		
>5 kms	0.702	.306-1.611	0.404
Literacy: Attended school	1		
No schooling	1.23	.482-3.143	0.665
Knowledge about TB: Good	1		
Moderate	1.583	.596-4.206	0.357
Poor	1.773	.751-4.183	0.191
TB status:TB negative	1		
TB positive	1.12	.54-2.33	0.74

Risk factors	Odds ratios	95% CI	P value
Alcohol Use: Abstainer	1		
Present user	1.085	.407-2.889	0.87
Past user	0.533	.200-1.420	0.208
OccupationUnemployed	1		
Daily wager	0.603	.163-2.223	0.447
Farmer	0.615	.163-2.324	0.474
Housewife	0.761	.195-2.974	0.695
Student	0.224	.056-.898.	0.035
Total expenditure on Illness<100	1		
100-399	1.197	.496-2.887	0.689
≥ 400	2.505	1.168-5.373	0.018
Monthly / capita income ≥ Rs. 600	1		
Rs.251-Rs.599	1.713	.687-4.273	0.249
<Rs.250	1.699	.742-3.890	0.21

Table-A4. Helath system delay and risk factors : Multiple logstic regression analysis

Risk factors	Odds ratios	95% CI	P value
Sex: Male	1		
Female	0.75	.33-1.73	0.51
Age: <45 years	1		
> 45 years	1.08	.48-2.41	0.84
Choice of first health provider			
Govt Provider	1		
Private provider	33.1	13.44-81.49	<. 001
No self medication	1		
Self-medication used	0.17	.09- .34	<. 001
Trad Healer (No)	1		
Trad healer (Yes)	0.69	.33- 1.45	0.33
Others	1		
ST	0.753	.335-1.94	0.492
SC	3.73	1.231-11.301	0.02
OBC	2.29	1.080-4.855	0.031

Risk factors	Odds ratios	95% CI	P value
Marital status: Married	1		
Single	1.22	.57-2.61	0.6
Walking	1		
Vehicle	2.37	.990-5.677	0.053
Combination of both	0.43	.109-1.761	0.245
Distance: 1-5kms	1		
>5 kms	2.37	1.12-4.99	0.02
Literacy: Attended school	1		
No schooling	0.59	.24-1.40	0.23
Alcohol Use:Abstainer	1	.407-2.88	0.87
Present User	1.085	.200-1.42	0.208
Past User	0.533		
Knowledge about TB: Good	1		
Moderate	1.037	.435-2.475	0.934
Poor	0.518	.254-1.056	0.07
TB status: TB negative	1		
TB positive	1.06	.54-2.06	0.86
Unemployed	1		
Daily wager	2.048	.556-7.548	0.282
Farmer	1.258	.332-4.771	0.736
Housewife	1.095	.283-4.240	0.895
Student	0.493	.150-1.618	0.244
Others	0.896	.275-2.922	0.855
Total expenditure on Illness <100	1		
100-399	1.853	.862-3.986	0.114
≥400	2.501	1.220-5.128	0.012
Monthly /capita income ≥Rs. 600	1		
Rs.251-Rs.599	0.588	.255-1.358	0.214
<Rs.250	0.688	.323-1.462	0.331