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Factors amounting to the delay in diagnosis and treatment of pulmonary Tuberculosis: A cross sectional study in a tertiary care hospital of South India

Harish B.R[1], Sudhir[2], Kavyashree M Arun[3]

1. Professor and Head, Department of Community Medicine, 2.Assistant Professor, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya & 3. Internship Student

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Address for correspondence: Dr Sudhir, Assistant Professor, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya, Karnataka. E.mail id: dheergowda@yahoo.co.in

Abstract

Introduction: The most essential components of TB control are early diagnosis and adequate treatment. Delay in the diagnosis and treatment of tuberculosis may result in more extensive disease, more complications, increase severity of the disease and is associated with higher risk of mortality. It has been seen that patients move from one health care provider to other resulting in delay in diagnosis and start of treatment for tuberculosis. The purpose of this study was to identify factors associated with delayed diagnosis of TB. **Material and methods**: A cross sectional study was conducted between 1st November to 31st December 2016 among 53 new sputum positive (NSP) TB patients registered under the DOTS centre in a tertiary care teaching hospital. We used the questionnaire of WHO multi-country study to estimate the diagnostic and treatment delay in TB. Data was collected and entered in Microsoft Excel sheet and was analysed using Epi-Info (version,3.5.1) and open Epi software. **Results**: The median patient delay, health system delay, and total delay were 22 days, 3 days and 29.5 days respectively. The unacceptable patients delay was 51.21% (95% CI: 45.12-53.29) of all new patients, whereas it was 21.87% (95% CI: 17.23-26.24) for the unacceptable health system delay and the unacceptable total delay was 54.21% (95% CI: 47.91-57.75).**Conclusion:** TB diagnosis and treatment is still a significant problem. Majority of unacceptable delays were from patient's side. Identifying factors influencing delays and developing evidence-based approaches to address those delays will help in advancing tuberculosis prevention and management.

Keywords: Cross-sectional study, DOTS, Health system delay, Patient delay

INTRODUCTION

One-third of the world's population is thought to be infected with TB. More than 5.7 million new cases of TB (all forms, both pulmonary and extra-pulmonary) were reported to WHO in 2013; 95% of these cases are reported from developing countries. However, because of insufficient case detection and incomplete notification, reported cases may represent only about two-thirds of the total estimated cases. The WHO estimated that 9 million new cases of TB occurred worldwide in 2013. The South-East Asia Region accounts for 39% of the global burden of TB in terms of incidence and India alone accounts for 24% of the world's TB cases. India is the highest TB burden country in the world in terms of absolute number of incident cases that occur each year[1].

The risk of acquiring M. Tuberculosis infection is determined mainly by exogenous factors. The probability of contact with a person who has an infectious form of TB, the intimacy and duration of that contact, the degree of infectiousness of the case, and the shared environment in which the contact takes place are all important determinants of the likelihood of transmission. Because of delays in seeking care and in making a diagnosis, it is generally estimated that, in high-prevalence settings, up to 20 contacts maybe infected by each AFB-positive case before the index case is diagnosed[2].

Unlike the risk of acquiring infection with M. Tuberculosis, the risk of developing disease after being infected depends largely on endogenous factors, such as the individual's innate immunologic and non-immunologic defences and the level at which the individual's cell mediated immunity (CMI) is functioning[3].

Limited knowledge about signs and symptoms of TB, poor health seeking behaviour, and poor diagnosis and disease management in health facilities result in delays in TB diagnosis and treatment, which in turn, increase the risk of TB transmission and the development of MDR-TB[4]. Available evidence shows that only 47% of Chinese patients with TB symptoms seek healthcare in a timely fashion and only 59% comply with prescribed treatment [5].

Delay in diagnosis of TB and initiation of anti-tubercular treatment (ATT) contributes to more severe disease manifestations in the individual and higher disease transmission in the community. This delay occurs at three levels:

1. Firstly the patients may ignore their symptoms and take longer to approach a health care provider (**pre-provider delay**).
2. Second, health care providers may fail to diagnose TB, and unsuccessfully treat patients for other competing conditions (**provider delay**).
3. Lastly, a delay may occur while diagnosis is being established during hospitalization (**in hospital delay**).

To assess the above factors a cross-sectional study was performed amongst patients with tuberculosis attending the district DOTS centre. A pilot tested questionnaire was administered to these patients to determine time periods each of them have spent before seeking healthcare, time spent in the referral chain with various health care providers and during hospital till the time a definite diagnosis was made and anti-tubercular therapy was initiated.

Biostatistics shows huge gap between the number of cases registered in the tuberculosis centres and the actual estimated disease burden. This study is an attempt to invert the ice-berg of tuberculosis prevalence in the society by identifying factors associated with the delay in healthcare seeking behaviour. Application of the collected and analysed data for decreasing the number of undiagnosed cases is an avenue for further evaluation and appropriate actions towards prevention.

MATERIALS AND METHODS

Study area and population*:* A cross sectional study was conducted among the new sputum positive (NSP) TB patients registered under the DOTS centre in a tertiary care teaching hospital of Mandya district.

Operational definitions:

We have defined the 'total delay' as the time interval from the onset of symptoms of TB until the initiation of anti-tuberculosis drugs, arbitrarily we have taken delay of > 28 days as total delay. It is the sum of two time intervals: 'patient delay' is defined as time interval between onset of symptoms and presentation to a health care provider, arbitrarily we have taken it as > 30 days and 'health system delay' is defined as time interval between the consultation at a health facility and the initiation of anti-tuberculosis treatment, arbitrarily we have taken it as > 7 days. The total delay will also be considered as the sum of diagnostic delay and treatment delay. Diagnostic delay is defined as the time interval between the onset of symptoms and labeling of the patient as a tuberculosis patient (tuberculosis diagnosis) while treatment delay is defined as the time interval between tuberculosis diagnosis and initiation of anti-tuberculosis drugs. Health facility is defined as all government and private health facilities manned by qualified health care providers[6].

Sample size and Sampling procedure:

In DOTS centre of our tertiary teaching hospital, Mandya district, during November and December 2015, about 51 NSP cases were registered. With this it is expected that during two months of data collection approximately 50 patients can be recruited for the study. The sampling method was purposive sampling method.

Inclusion criteria: All new sputum positive patients who gave consent and reported DOTS centre during study period.

Exclusion criteria: Those patients who were seriously ill or debilitated at the time of interview.

Data collection:

We used the questionnaire of WHO multi-country study to estimate the diagnostic and treatment delay in TB. The questionnaire was pilot-tested on 10 TB patients and then based on results of pilot testing it was suitably modified for local use. Using this questionnaire, the TB patients were interviewed and data was collected about socio-demographic characteristics and factors determining the delay in diagnosis and treatment of TB.

Period of data collection: Data was collected for a period of two months from 1st November to 31st December 2016

Data analysis:

Data was collected and entered in Microsoft Excel sheet and was analyzed using Epi-Info (version, 3.5.1) and open Epi software**.** We calculate the mean and median delays along with their ranges. We calculated the proportion delay with its confidence interval for the risk factors associated with patient, health system and total delays.

Ethical consideration: Informed consent was taken from the persons before collecting information and an Ethical committee approval was obtained from Institutional ethical committee.

RESULTS

All the 53 new smear positive pulmonary TB patients who got registered in the DOTS centre of a tertiary care teaching hospital during the study period were enrolled . The median patient, health system and total delay were 22 (IQR 9-49), 3 (IQR 0-5) and 29.5 (IQR 10-51) days respectively [Table 1].

Majority of study subjects were male and most of study participants were from rural area. Most of them had schooling up to primary standard. Majority of them were smoking or used to smoke. When we compare the

knowledge and symptoms of the study participants it was seen that majority of them had the knowledge about tuberculosis and most of them presented with fever and cough at the time of diagnosis. Majority of the study participants first contact with the health was with the Government health facility [Table2].

Table-1 Magnitude of delay at various levels

Characteristics	Number of days	Delay (%)	95% CI
Patient delay	148	51.21	45.12-53.29
Mean(SD)	38.51(56.33)		
Median(IQR)	22(9-49)		
Health system delay	65	21.87	17.23-26.24
Mean(SD)	11.36(41.26)		
Median(IQR)	3(0-5)		
Total delay	188	54.51	47.91-57.75
Mean(SD)	55.48(72.67)		
Median(IQR)	29.5(10-51)		

The prevalence of patient delay was 51.21% (95% CI: 45.12-53.29) [Table 1]. The given [Table 2] illustrated that there was high prevalence of patient delay observed among those who lived in rural areas (67.19%, 95% CI: 59.36-76.24). The patients who were unable to achieve the primary education have 59.67 % (95% CI: 48.22-71.91) of patient delay. In addition, 68.21% (95% CI: 52.62-83.65) of the patient delay has been observed among the respondents, who smoked < 11 cigarettes per day. The patients, who lived more than 2 km far from the DOTS centers had the high prevalence of patient delay (69.13%, 95% CI: 59.12-79.39).

However, the patient who had completed their secondary education were found to have less patient delay (42.26%, 95% CI: 34.36-53.35) in comparison with those who were less educated. Similarly, those who have an access of DOTS center within walking distance were observed to have less prevalence of patient delay (46.65%, 95% CI: 43.28-54.22).

This study revealed that the proportion of health system delay was 21.87% (95% CI: 17.23-26.24) [Table 1]. The increased prevalence was observed among those who don't have basic knowledge on tuberculosis (35.38%, 95% CI: 27.21-45.39). However, daily wage workers (10.71%, 95% CI: 1.02-45.39) had less prevalence of health system delay [Table 2].

DISCUSSION

The present study is undertaken at a DOTS centre in South India to know the, magnitude and reasons for various types of delay in seeking treatment for TB.

Majority of those who attended the centre were males and were below 45 years of age. These findings are similar to other Indian studies. This could be explained by the fact that males in India are generally more literate, financially independent and are not culturally inhibited to go to a health care facility[7].

Most of the study subjects had only primary schooling. It is a well-established fact that incidence of TB correlates inversely with educational status persons with less education are also likely to delay seeking medical help, compared to those with higher education. These findings are similar to those of other Indian and south Asian studies[8].

Majority of the subjects are from rural areas, but a positive association cannot be inferred because this centre caters mostly to rural population. Most of the studies also report a higher incidence of cases from rural areas[9]. There is a need for TB awareness programmes in rural areas and also establishment of more primary healthcare facilities to diagnose TB in remote regions.

In the present study 81% of the subjects were smokers. There is significantly more delay among smokers in seeking treatment than non-smokers. This is a consequence of the misconception amongst the smokers that cough, the most predominant symptom of TB is smoker's cough. Most of the smokers in the present study also had chronic bronchitis, with similar symptoms as those of pulmonary TB. This is a major factor in misdiagnosis and delay in treatment. Another study from rural central India reported that being a smoker is a significant factor in pre provider delay and concurs with the present study[10].

The main symptoms for which the subjects sought treatment were fever with cough, cough, weight loss and chest pain. There is a need to educate rural people about these symptoms through mass media campaigns. Most of the patients first went to a traditional healer for treatment. This is true not only in India but also in China where the belief in traditional medicine is very strong[11]. Hence there is a need to train the traditional healers to identify the symptoms of TB and motivate them to refer suspected cases to TB diagnostic centers.

In the present study, the first contact of the subjects with a qualified person were either a PHC medical officer or a general physician. To avoid delay at the point of first contact, regular training and continuing medical education must be provided to PHC faculty and private practitioners from rural areas. Most of the subjects delayed seeking treatment in the hope of spontaneous resolution of symptoms, others were in fear of a diagnosis and some had economic constraints. Some patients had to travel >2 km to a healthcare facility. Whereas other Indian studies reported a distance of 50 km to a healthcare facility which is far worse than the present study. Other factors that constrain the patients are the cost of going to a private practitioner and hidden costs like travel expenses and loss of wages. These have to be overcome by improving the infrastructure in government run Primary health centres, making doctors available round the clock and training of paramedical staff in detecting TB. All the other Indian studies concur with these findings[12].

Surprisingly, knowledge about TB is good (75%) in the subjects. They knew the mode of spread, the curability of the disease and that treatment is for a long period. The role played by mass media in spreading this knowledge is laudable and there is a need for sustained campaign utilizing these media.

Table 2: Prevalence of patient delay and health system delay by different independent variables and their 95% CI

Characteristics	Patient Delay			Health system delay		
	n	(%)	95%CI	n	(%)	95%CI
Gender						
Male	26	55.85	49.41-62.28	12	28.07	22.40-33.73
Female	10	54.14	45.76-62.52	5	29.85	22.34-37.38
Age(years)						
<45	19	53.01	44.89-61.13	11	35.56	27.89-43.22
≥45	17	58.43	50.12-66.54	6	22.51	15.72-29.31
Residence						
Urban	14	48.79	43.39-55.13	9	30.72	25.54-36.79
Rural	22	67.19	59.36-76.24	8	24.44	16.79-31.71
Educational Status						
Upto Primary	20	59.67	48.22-71.91	7	20.64	11.58-30.28
Secondary and above	15	42.26	34.36-53.35	11	34.51	25.76-43.51
Employment status						
Daily wagers	20	49.41	30.78-68.05	5	10.71	1.02-23.21
Others	22	63.39	53.55-73.23	8	20.21	12.21-28.22
Smoking						
Never	6	52.13	45.17-58.43	4	29.52	23.78-35.68
Currently /used to smoke but stop currently	30	59.67	51.76-67.63	13	27.33	20.14-33.76
No. of beedies/cigarette smoked per day(n=41)						
<11	15	68.21	52.62-83.65	5	19.13	6.61-33.52
≥11	14	51.71	42.46-61.16	6	24.19	15.71-32.03
Symptoms present before diagnosis (n=50)						
Cough	10	56.14	42.77-68.32	5	26.61	21.31-34.17
Fever and cough	23	51.62	46.61-57.92	12	22.44	11.32-33.12
Basic knowledge on TB						
Yes	23	53.31	47.33-58.13	17	22.17	17.22-27.43
No	8	54.12	44.75-61.22	5	35.38	27.21-45.39
Distance to reach the TB center						
≤2K.M	13	46.65	43.28-54.22	7	26.23	21.32-33.52
>2K.M	25	69.13	59.12-79.39	8	23.42	14.39-33.72
Centre of first contact						
Government health facility	27	53.42	46.71-60.42	14	25.91	21.36-34.21
Private health facility	8	50.71	42.68-58.44	5	22.91	18.87-31.63

Delay in seeking treatment is more on part of the patient rather than the health care providers. This is a consistent finding of all studies whether they are from China, South-east Asia or Latin America. Hence there is a urgent need to step up TB awareness campaigns on the lines of HIV. There is a gender angle to the treatment seeking behavior with more delay on the part of women. This is due to socio cultural factors. Smoking is a serious factor which masks the diagnosis.

There is also a need to address delay at a health care facility with a similar delay was found in other studies. As most of the cases were diagnosed by an internist or a general physician there is a need to conduct regular CME programmes on TB for doctors from other specialties. As most of the patients preferred to visit private doctors

rather than government facilities, there is a need to develop public private partnership so that even privately treated patients have access to free medicines. As TB is a disease with a long course of treatment purchasing the drugs can be a drain on the patients' finances and may lead to default of treatment.

Conclusion:

Throughout the study, there were significant differences in socioeconomic status, feeling of stigma, knowledge and satisfaction with care. Most patients acknowledged accessibility of private practitioners and greater confidence in being cured as the main reasons for seeking initial care from the private sector compared to their lack of confidence in the quality of services in the public sector. Stigma proved to be a major determinant of health-seeking behaviour, where fear of being diagnosed with tuberculosis and fear of social isolation, were the main obstacles to timely health-seeking behaviour. A strong emphasis on health education is therefore recommended. The significant risk factors for health care system delay that were frequently reported from the studied countries were: time to reach health facility of more than half an hour, economic burden of the disease and high cost of medical services, seeking care at a non-specialized health facility including the private sector, and more than one health care encounter before diagnosis.

Recommendations :

Efforts should be made to increase public awareness about the symptoms of tuberculosis and to educate them about the importance of seeking early care and the availability and location of free diagnostic services.

Efforts should be made to educate both public and private physicians about the need to maintain a high index of suspicion of tuberculosis and rapidly performing appropriate tests.

Effective collaboration should be developed between private and public providers to ensure an effective public–private mix of services.

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