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RESEARCH ARTICLE

Evaluation of health care seeking behaviour and various factors determining treatment delays among pulmonary tuberculosis patients attending a tertiary care hospital in North India

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Abstract

Background: When a person develops active Tuberculosis (TB), the symptoms such as productive cough, fever, night sweats and weight loss may be mild for many months. This can lead to delays in seeking health care. As delay in TB diagnosis may increase infectivity, worsen the disease state, and enhance the risk of death, hence, early diagnosis and prompt treatment remain essential components for effective tuberculosis control.

Objectives: To study the health care seeking behaviour and factors determining the treatment delays among tuberculosis patients.

Methodology: An Out Patients Department based, descriptive, observational study was carried out among adult pulmonary tuberculosis patients attending a tertiary care hospital. Detailed history and physical examination was done to assess the health care seeking behaviour and various factors associated with treatment delays.

Results: Unacceptable delay in treatment of more than 8 weeks was present in 73.6% of patients. Delay was more in the age group < 40 years (OR = 5.39), among males (OR = 1.69), in patients from rural areas (OR= 1.81) and those who were either illiterate or primary educated (OR = 12.61). Unacceptable delay was also seen among unemployed and unskilled workers (OR = 7.27), and among patients of poor socioeconomic status (OR = 16.97).

Conclusion: Increasing the awareness of tuberculosis symptoms to the general population, along with engagement of informal care providers and strengthening of existing public-private models should be done for timely diagnosis and treatment, thereby, helping in TB control.

INTRODUCTION

India is the highest Tuberculosis (TB) burden country in the world. In 2013, India alone accounted for one-fourth of the estimated global TB cases (Park, 2015).When a person develops active TB disease, the symptoms such as productive cough, fever, night sweats and weight loss may be mild for many months. This can lead to delays in seeking health care, which results in transmission of the bacteria to others. People ill with TB can infect up to 10-15 other people through close contact over the course of a year. Without proper treatment up to two thirds of people ill

with TB die. Detection of tuberculosis in early stage followed by an effective treatment is important for controlling the disease in population (Pitman *et al.*, 2002).

Delay in TB diagnosis may increase infectivity, worsen the disease state, and enhance the risk of death (Lienhardt *et al*., 2001; Golub *et al*., 2006). Because of this some studies have investigated reasons for delays in treatment (Lewis *et al.*, 2003; Guneylioglu *et al.*, 2004; Paynter *et al.*, 2004). Since the late 1990s, the coverage of Directly Observed Treatment Short Course (DOTS) has increased in many developing countries, but this was not coupled with a parallel rise in the case detection rate (Ukwaja *et al.*, 2013). Among TB patients, many factors affect the time from symptom onset to being treated, which may include failure to access specialised TB services (Storla *et al.*, 2008). Studies on delays in TB treatment and the associated factors in delay diagnosis of TB patients have been done worldwide. As these factors can vary in different populations and health care systems, specific evaluation of factors affecting delay in patient diagnosis in each setting is required. The starting point from which the delays are measured is uncertain and there is no agreed definition as to what constitutes an acceptable delay. In studies the panels of expert have agreed on an acceptable total delay of 60 days from symptom onset to being treated (Santos *et al.*, 2005). The present study was done to assess the healthcare seeking behaviour, delay in treatment, and to identify the determinants of treatment delays among adult tuberculosis patients attending a tertiary care hospital in North India.

MATERIALS AND METHODS

Study Design: This observational, descriptive, Out Patients Department (OPD) based study was done in adult pulmonary tuberculosis patients, attending the TB and Chest OPD, at a tertiary care hospital for the assessment of health care seeking behaviour and treatment delays. Institutional research and ethical approval was obtained and the study was conducted from January to December, 2014.

Sampling technique: Purposive sampling was done.

Study Material: Adult pulmonary tuberculosis patients reporting to the hospital during the study period.

Inclusion criteria: Adult pulmonary tuberculosis patients who agreed to participate were included in the study.

Exclusion criteria: Patients who refused to participate and those suffering from other serious illness were excluded.

Study subjects: A total of 121 adult pulmonary tuberculosis patients were included in the study.

Method: Informed consent was obtained and the patients were interviewed followed by a detailed clinical examination. A pre-designed interview schedule was used to collect the necessary information from the patients such as information about the patient's socio demographic characteristics, onset of symptoms, and health care seeking behaviour, on a semi-structured questionnaire. Patients were also asked how long ago they first showed symptoms of pulmonary tuberculosis. In this way, the total delay (from onset of symptoms to start of tuberculosis treatment) was ascertained directly from the patients. Up to 8 weeks of treatment delay was considered acceptable and beyond 8 weeks it was considered unacceptable (Santos *et al.*, 2005). The socioeconomic status was assessed using the Kuppuswamy's Scale (Kumar *et al.*, 2013).

Statistical analysis: Data from the interview schedule was transferred to a computer and SPSS Data Editor Software version 19 was used for analysis. The data was analyzed in terms of descriptive statistics mean, and standard deviation (SD). Chi-square test was performed and $p < 0.05$ was considered statistically significant. Both univariate and multivariate logistic regression analysis was performed to assess the various patient related, medication related and health system related factors for delay in treatment. Odds ratio (OR) and corresponding 95% confidence interval (CI) are reported.

RESULTS

Total 121 pulmonary tuberculosis patients were included in the study. 65.3% were males and 34.7% were females. The mean age of patients was 38.64 ± 11.24 years. Majority (40.1%) of patients were in the age group of 30 – 39 years. In all age groups males were more as compared to females. Mean duration of symptoms before the patients visited the tertiary care hospital was 11.12 ± 3.3 weeks.

Delay in treatment was calculated from the onset of symptoms to reporting at the tertiary care hospital. Unacceptable delay in treatment of more than 8 weeks was present in 73.6%, and acceptable delay in treatment of up to 8 weeks was present in 26.4% of pulmonary tuberculosis patients. Unacceptable delay was more in the age group < 40 years as compared to those ≥ 40 years (OR = 5.39). Delay in treatment of more than 8 weeks was more common among males than among females (OR = 1.69). Unacceptable delay in treatment was more in patients from rural areas than those from urban areas (OR= 1.81). Married patients had acceptable delay in treatment as compared to singles (OR = 0.90) [Table 1].

Unacceptable delay in treatment was seen in patients who were illiterate or had primary education (OR = 12.61), unemployed and unskilled workers (OR = 7.27), and in lower and lower middle socioeconomic status (OR = 16.97). Patients having a positive family history of tuberculosis had acceptable delay in treatment (OR = 0.21) [Table 2]. Delay in treatment of more than 8 weeks was seen in patients having the habit of consuming alcohol (OR = 3.57), tobacco chewing (OR = 2.41), and smoking (OR = 2.56) [Table 3].

Unacceptable delay in treatment was seen in patients having symptoms of productive cough (OR = 3.88), fever (OR = 2.60), and weight loss (OR = 2.47). Patients having haemoptysis had acceptable delay in treatment (OR = 0.16) [Table 4]. Delay in treatment of more than 8 weeks was seen in patients who initially consulted private clinics (OR = 3.87), sought treatment from pharmacy and drug shops (OR = 2.49), and sought treatment from traditional healers (OR = 1.64) [Table 5]. Unacceptable delay in treatment was also seen in patients having distance of > 4 km from hospital (OR = 3.45), experienced long waiting time at hospital (OR = 2.87), and among those who believed to get better treatment elsewhere (OR = 2.53) [Table 6].

Multivariate logistic regression analysis was performed for the determinants of unacceptable delay in treatment. Adjusted odds ratios for unacceptable delay in treatment are Low education level (OR=2.73), low socioeconomic status (OR = 6.06), distance from hospital of > 4 Km (OR=1.59) and residence in rural area (OR=1.13) [Table 7].

Table 1: Association between treatment delay and socio-demographic variables

Variables	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Age					
< 40 years	68 (85.0%)	12 (15.0%)	80 (100%)	< 0.001	5.39 (2.27-12.84)
≥ 40 years	21 (51.2%)	20 (48.8%)	41 (100%)		
Sex					
Male	61 (77.2%)	18 (22.8%)	79 (100%)	0.210	1.69 (0.74-3.88)
Female	28 (66.7%)	14 (33.3%)	42 (100%)		
Residence					
Rural	69 (76.7%)	21 (23.3%)	90 (100%)	0.186	1.81 (0.75-4.37)
Urban	20 (64.5%)	11 (35.5%)	31 (100%)		
Marital status					
Married	65 (73.0%)	24 (27.0%)	89 (100%)	0.829	0.90 (0.36-2.28)
Single	24 (75.0%)	8 (25.0%)	32 (100%)		

N = Number of patients. CI = Confidence Interval.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio.

Table 2: Association between treatment delay and risk factors of tuberculosis

Risk Factors	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Educational Status					
Illiterate and Primary	74 (89.2%)	9 (10.8%)	83 (100%)	< 0.001	12.61 (4.88-32.59)
Secondary and above	15 (39.5%)	23 (60.5%)	38 (100%)		
Occupation					
Unemployed, Unskilled workers	77 (83.7%)	15 (16.3%)	92 (100%)	< 0.001	7.27 (2.89-18.30)
Skilled, Professional	12 (41.4%)	17 (58.6%)	29 (100%)		
Socioeconomic status					
Lower, Lower Middle	70 (87.9%)	11 (12.1%)	91 (100%)	< 0.001	16.97 (6.22-46.29)
Upper Middle, Upper	9 (30.0%)	21 (70.0%)	30 (100%)		
Family history of TB					
YES	42 (61.8%)	26 (38.2%)	68 (100%)	0.001	0.21 (0.08-0.55)
NO	47 (88.7%)	6 (11.3%)	53 (100%)		

N = Number of patients. CI = Confidence Interval.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio.

Table 3: Association between treatment delay and addiction

#Addiction	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Alcohol					
YES	24 (88.9%)	3 (11.1%)	27 (100%)	0.040	3.57 (0.99-12.81)
NO	65 (69.1%)	29 (30.9%)	94 (100%)		
Chewing Tobacco					
YES	58 (80.6%)	14 (19.4%)	72 (100%)	0.034	2.41 (1.06-5.48)
NO	31 (63.3%)	18 (36.7%)	49 (100%)		
Smoking					
YES	41 (83.7%)	8 (16.3%)	49 (100%)	0.037	2.56 (1.04-6.32)
NO	48 (66.7%)	24 (33.3%)	72 (100%)		

Addiction of more than one type was present in patients. N = Number of patients.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio. CI = Confidence Interval.

Table 4: Association between treatment delay and tuberculosis symptoms

Symptoms	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Productive cough					
YES	84 (76.4%)	26 (23.6%)	110 (100%)	0.027	3.88 (1.09-13.75)
NO	5 (45.5%)	6 (54.5%)	11 (100%)		
Fever					
YES	57 (81.4%)	13 (18.6%)	70 (100%)	0.021	2.60 (1.14-5.97)
NO	32 (62.7%)	19 (37.3%)	51 (100%)		
Weight loss					
YES	61 (80.3%)	15 (19.7%)	76 (100%)	0.030	2.47 (1.08-5.64)
NO	28 (62.2%)	17 (37.8%)	45 (100%)		
Haemoptysis					
YES	6 (37.5%)	10 (62.5%)	16 (100%)	< 0.001	0.16 (0.05-0.49)
NO	83 (79.0%)	22 (21.0%)	105 (100%)		

N = Number of patients. CI = Confidence Interval.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio.

Table 5: Association between treatment delay and initial visit to Non-DOTS provider

Non-DOTS providers initially visited	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Private clinics					
YES	83 (76.9%)	25 (23.1%)	108 (100%)	0.018	3.87 (1.19-12.59)
NO	6 (46.2%)	7 (53.8%)	13 (100%)		
Pharmacy/drug shop					
YES	80 (76.2%)	25 (23.8%)	105 (100%)	0.092	2.49 (0.84-7.37)
NO	9 (56.2%)	7 (43.8%)	16 (100%)		
Traditional healer					
YES	78 (75.0%)	26 (25.0%)	104 (100%)	0.372	1.64 (0.55-4.86)
NO	11 (64.7%)	6 (35.3%)	17 (100%)		

DOTS = Directly Observed Treatment Short course. N = Number of patients.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio. CI = Confidence Interval.

Table 6: Association between treatment delay and reasons for seeking treatment from Non-DOTS providers.

Reason for seeking treatment from Non-DOTS providers	Treatment delay		Total (N=121) (100%)	* p value	**Odds Ratio (95% CI)
	Unacceptable (> 8 Weeks) (N=89) (73.6%)	Acceptable (≤ 8 Weeks) (N=32) (26.4%)			
Distance to hospital					
> 4 km	67 (81.7%)	15 (18.3%)	82 (100%)	0.003	3.45 (1.48-8.03)
≤ 4 km	22 (56.4%)	17 (43.6%)	39 (100%)		
Long waiting time					
YES	59 (81.9%)	13 (18.1%)	72 (100%)	0.011	2.87 (1.25-6.60)
NO	30 (61.2%)	19 (38.8%)	49 (100%)		
Belief to get better treatment elsewhere					
YES	66 (79.5%)	17 (20.5%)	83 (100%)	0.028	2.53 (1.09-5.87)
NO	23 (60.5%)	15 (39.5%)	38 (100%)		

DOTS = Directly Observed Treatment Short course. N = Number of patients.
* Chi square test was applied, degree of freedom = 1, p value < 0.05 statistically significant.
** Univariate regression analysis. Unadjusted Odds Ratio. CI = Confidence Interval.

Table 7: Determinants of unacceptable treatment delay (> 8 weeks) among tuberculosis patients

Variables	* Univariate analysis		# Multivariate analysis	
	p value	Unadjusted Odds Ratio (95% CI)	p value	Adjusted Odds Ratio (95% CI)
Education (Illiterate/Primary)	< 0.001	12.61 (4.88-32.59)	0.261	2.73 (0.47-15.75)
Socioeconomic status (Lower class)	< 0.001	16.97 (6.22-46.29)	0.053	6.06 (0.97-37.73)
Distance (> 4 km)	0.003	3.45 (1.48-8.03)	0.537	1.59 (0.37-6.86)
Residence (Rural)	0.186	1.81 (0.75-4.37)	0.878	1.13 (0.25-5.09)

* Univariate regression analysis. p value < 0.05 statistically significant. CI = Confidence Interval.
# Multivariate logistic regression analysis.

DISCUSSION

In the present study 73.6% of the patients had unacceptable (> 8weeks) delay in treatment, which was much higher than studies done in Malaysia (52%) (Rundi *et al.*, 2011), Philippines (50%) (Auer *et al.*, 2000), Spain (43%) (Diez *et al.*, (2004), Ethiopia (41%) (Demissie *et al.*, 2002), Zambia (35%) (Godfrey-Faussett *et al.*, 2002), and Iran (12%) (Masjedi *et al.*, 2002). However our finding was lower than that of urban Nigeria (83%) (Odusanya and Babafemi, 2004). This suggests that the proportion of patients who sought late treatment of TB symptoms was much higher in our country compared to other countries. Those with unacceptable delay may be more infectious and should be targeted when resources are scarce.

In this study unacceptable delay was associated with young age, among males and among patients from rural areas. Other studies have found association of delay in treatment with those relating to old age (Lienhardt *et al*., 2001; Ward *et al.*, 2001; Paynter *et al.*, 2004). In a study delay was associated with male sex (Hooi, 1994). However in other studies delay was more for female sex (Long *et al.*, 1999; Thorson *et al*., 2000; Rodger *et al.*, 2003). Another study has reported difficulty of access to health care due to living in rural areas (Lienhardt *et al*., 2001). In the present study unacceptable delay in treatment was seen in patients who were illiterate and primary educated, unemployed and unskilled workers, and from poor socioeconomic status. In another study delay in seeking treatment was associated with having less education (Hooi, 1994). Low education may be related to inadequate knowledge

about tuberculosis. Similar finding of association have been reported from other studies relating to perception and inadequate knowledge about TB (Wandwalo and Morkve 2000; Demissie *et al.*, 2002; Lewis *et al.*, 2003), and lack of perception of the need to seek health care (Ngamvithayapong *et al.*, 2001), lack of information on the availability of free treatment (Odusanya and Babafemi, 2004), and lack of money (Auer *et al.*, 2000). A study has reported association between unemployment and delay in treatment (Santos *et al.*, 2005).

In this study, unacceptable delay in treatment was seen in patients who were having addiction of consuming alcohol, tobacco chewing, and smoking. Similarly another study reported association of alcohol consumption and smoking with treatment delay (Rundi *et al.*, 2011). Alcoholism has been associated with delay in treatment in other studies (Rajeswari *et al.*, 2002; Santos *et al.*, 2005).

In this study unacceptable delay in treatment was seen in patients having symptoms of productive cough, fever, and weight loss. On the other hand patients having haemoptysis had less delay in treatment. Other studies also showed similar finding of shorter delays in treatment in patients who had productive cough with haemoptysis (Sherman *et al.*, 1999; Lienhardt *et al*., 2001; Rajeswari *et al.*, 2002). However, a study did not find shorter delay in treatment in patients having productive cough even with haemoptysis (Santos *et al.*, 2005).

In the present study unacceptable delay in treatment was seen in patients who initially consulted private clinics, pharmacy/drug shops, and sought treatment from traditional healers. Another study revealed that patients whose usual first place for treatment was a non-government health facility likely to have a delay in treatment (Rundi *et al.*, 2011). Similar findings of delay in treatment associated with use of non-government health services (including traditional healers and private clinics) were seen in studies done in China (Bai and Xiao, 2004), Zambia (Godfrey-Faussett *et al.*, 2002) and Tanzania (Wandwalo and Morkve, 2000). In contrast, TB patients in South India who first consulted government providers were twice as likely to delay in treatment as those who sought private clinics (Rajeswari *et al.*, 2002).

In this study, those who preferred private practitioners, pharmacy/drug shops, and traditional healers had an increased risk of delay in treatment for TB. This may be due to the symptomatic treatment offered to these patients rather than proper treatment for TB. Therefore to reduce the treatment delays in TB, high suspicion for TB should be done by all health care providers. This study suggests that private practitioners, pharmacy/drug shops and traditional healers should be involved in the early detection of TB by referring the patients to a diagnostic clinic. In Malawi and Nigeria, drug shop owners and traditional healers have indicated willingness to play a role in tuberculosis control (Brouwer *et al.*, 1998; Onyeneho and Chukwu, 2010).

In this study unacceptable delay in treatment was associated with long distance from hospital, experiencing long waiting time at hospital, and belief to get better treatment elsewhere. Similar long distance to public health facilities and treatment delay is reported from another study (Ukwaja *et al.*, 2013). Other studies reported association of delay in treatment with low or inadequate knowledge of TB (Demissie *et al.*, 2002; Odusanya and Babafemi, 2004), a poor perception of the health services (Auer *et al*.. 2000; Godfrey-Faussett *et al.*, 2002), and long distance to the nearest health facility (Masjedi *et al.*, 2002; Demissie *et al.*, 2002). Delay in treatment has been associated with travelling time and distance to health service. (Steen and Mazonde, 1998; Rajeswari *et al.*, 2002).

In this study multivariate logistic regression analysis was performed for the determinants of unacceptable delay in treatment. Low education level, low socioeconomic status, distance from hospital and residence in rural area were associated with unacceptable delay. In a systematic review of studies on TB diagnostic and treatment delay some of the factors associated with delays in the health seeking included low educational level, rural residence, longer walking distance to the nearest public facility, male gender, and an initial visit to a Non National Tuberculosis Programme (NTP) provider (Storla *et al.*, 2008).

CONCLUSION AND RECOMMENDATIONS

This study shows that poor patients living in a rural setting with high burden of TB frequently first access informal care providers for TB care before being diagnosed. This results in long delays in the diagnosis and treatment of TB. There is a need to modify health staff training to include active identification of symptoms that may indicate

tuberculosis, and to increase population awareness of tuberculosis symptoms, with emphasis on developing general health awareness. A review of practices to improve health services organization should also be carried out. Improved access to health care, education of patients and community in general, engagement of informal care providers and strengthening of existing public-private models in TB control may impact in reducing treatment delay and are therefore recommended.

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