ORIGINAL RESEARCH

Study on factors related to delay in diagnosis & treatment initiation among newly diagnosed drug sensitive pulmonary tuberculosis patients of Gadag district of Karnataka, India

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Abstract

Background: Tuberculosis (TB) has haunted the human race since time immemorial and continued to do so. In countries like India, the challenge lies not only in providing effective treatment but also in reducing the interval between suspecting TB and actually initiating the treatment. RNTCP emphasized on initiation of treatment within 7 days of diagnosis for patients with sputum smear-positive pulmonary TB (SS-PTB) as an indicator for monitoring DOTS implementation.

Objective:1. To find out the proportion of patients having delay in diagnosis and delay ininitiation oftreatment among newly diagnosed drug sensitive pulmonary tuberculosis patients of Gadag district 2. To describe associated factors responsible for total delay in treatment.

Methods: A cross-sectional study done among the 134 newly diagnosed TB patients of two Tubercular units selected randomly in the study period during June to August 2022.

Results: In our study mean total delay in treatment was 39.9±5.6 days (median: 40days, IQR5), patient delay 5.3±0.4 days, diagnosis delay consisting of 27.4±1.5 days and treatment initiation delay as 7.2±0.7 days. Among the mean total delay in treatment s 39.9days, diagnostic delay (67.5%) holds the major concern followed by delay in treatment initiation (18.2%) and patient delay consisting of 13.2%.

Conclusion: The delay in treatment initiation of TB was defined and estimated as Patient delay, diagnostic delay and treatment delay, out of these three delays, diagnostic delay was found to be major contributing in total.

Key words: Sputum smear, Pulmonary TB, patient delay, diagnosis delay

Introduction

Tuberculosis (TB) has haunted the human race since time immemorial and continued to do so.[1] Globally Tuberculosis (TB) causes an estimated 10.4 million cases and 1.7 million deaths globally, with the heaviest toll in Low- and Middle-Income countries (LMICs).[2] India has the highest TB burden country accounting for one fifth (21%) of the global incidence and 17th among the 22 high burden countries in terms of TB incidence rate. The World Health Organization included India in high TB burden countries despite effective implementation of directly observed treatment short course (DOTS) under the Revised National Tuberculosis Control Programme (RNTCP).[3]India has a complex and highly heterogeneous health care delivery system, with both public and private sector (both formal and informal) health care providers.[4]

In countries like India, the challenge lies not only in providing effective treatment but also in reducing the interval between suspecting TB and actually initiating the treatment. RNTCP emphasized on initiation of

treatment within 7 days of diagnosis for patients with sputum smear-positive pulmonary TB (SS-PTB) as an indicator for monitoring DOTS implementation.[5]In 2003, DOTS program successfully treated 84% of all registered new smear positive patients, but detected only 28% of the estimated tuberculosis cases in the world.[6] Various reasons including poverty, population growth, migration and HIV/AIDS are the major factors for the continued threat of TB in the world, but a significant problem lies with the fact that many cases remain undiagnosed. This could be due to number of factors, principally found within categories: patients delaying seeking healthcare or failure of health care systems to diagnose patients in a timely manner.[5] Early diagnosis of the disease and prompt initiation of treatment are essential for an effective tuberculosis (TB) control program.[7-9] With this background an effort has been made to know the reasons for delay in diagnosis treatment and its determinants in our study area.

Objective: 1. To find out the proportion of patients having delay in diagnosis and delay ininitiation oftreatment among newly diagnosed drug sensitive pulmonary tuberculosispatients of Gadag district2. To describe associated factors responsible for total delay in treatment.

Materials and Methods

This was part of a longitudinal study to assess the utilization pattern of monetary benefits in relation to nutrition among newly diagnosed tuberculosis patients in GIMS, Gadag, Karnataka. We enrolled two of seven TU units of Gadag district (by random selection)

Study sample: our study sample is calculated to be 134 assuming 45% of patients to have total delay of more than 30 days **[10],** with 20% of relative precision and considering 10% as non-responsive rate using formula as $4pq/d^2$

Inclusion criteria: All newly diagnosed drug sensitive adult TB patients receiving treatment under DOTSduring June to August 2022 and willing to participate in study.

Exclusion criteria: patients who are not willing and those patients whom we were not able to contact after two attempts and TB associated with other co-morbidities are excluded.

Data collection and Analysis: Data was collected on socio-demographic profile of TB patients from TB register at the tuberculosis units and other information like the first symptom patient presented with, the first level of contact of health care facility, date of diagnosis, date of treatment initiation, knowledge about TB and DOTS by using a semi-structured questionnaire administered on one to one contact with patients.

All the data collected is entered in excel sheet and analyzed by using openepi software, chi square test as test of significance.

Operational definitions study [11]

The delay in treatment initiation of TB was defined and estimated as

1. Total delay defined as time interval from the onset of symptoms until treatment initiation
2. Patient delay defined as the time interval between onset of symptoms and the patient's first contact with a health care provider
3. Diagnostic delay defined as the time interval between the first consultation with a health-care provider and diagnosis
4. Treatment delay defined as the time interval between diagnosis and initiation of anti-TB treatment.

Results

Table 1: Showing Socio-demographic profile of study subjects

Socio-demographic profile	Variables	Frequency (n=134)	Percentage
Age group	20-40 yrs.	64	47.76
	40-60 yrs.	42	31.34
	≥60 yrs.	28	20.90
Sex	Male	117	87.31
	Female	47	35.07
			0.00
Religion	Hindu	96	71.64
	Muslim	38	28.36
	others	nil	
Education	Primary	41	30.60
	Secondary	20	14.93
	PUC	27	20.15
	Postgraduate	16	11.94
	Illiterate	30	22.39
Occupation	Daily wage labour	60	44.78
	Professional	62	46.27

	Unemployed	12	8.96
Type of family	Nuclear	76	56.72
	Joint	58	43.28
Socio-economic status	Below Poverty Line (BPL)	88	65.5
	Above Poverty Line (APL)	46	34.5

It was seen from Table 1 that the total of 134 study sample comprising of 80% of males, majority (47.7%) of study subjects were in earning age group (20-40 yrs) where as 20% of participants were in elderly age group (60 yrs and above.).Among 134 subjects, 65.6% were BPL card holders and rest 34.5% had APL card 70% of subjects were Hindu, belong to nuclear families.

Table 2: Showing treatment delays

Delays	Mean and CI	Median (IQR)
Patient delay	5.3±0.36	5(4)
	SD=2.1	
Diagnosis delay	27.4±1.49	25(13)
	SD=8.8	
Treatment initiation delay	7.2±0.68	7(6)
	SD=4.2	
Total delay	39.9±1.567	40(15)
	SD=9.2	

As seen from Table 2 that the delay of treatment, In our study mean total delay in treatment was 39.9±5.6 days (median:40 days, IQR5), patient delay 5.3±0.4 days, diagnosis delay consisting of 27.4±1.5 days and treatment initiation delay as 7.2±0.7 days. Among the mean total delay in treatment s 39.9 days, diagnostic delay (67.5%) holds the major concern followed by delay in treatment initiation (18.2%) and patient delay consisting of 13.2%.

Table 3: Showing reasons for Delays

Reasons for delays		Frequency(n=71)	Percentage
Patient delay		n=11 (of total treatment delay)	
	First point of contact beinginformal sector	4	40.0
	Distance (>2 kms) of public health sector	5	50.0
	Others	2	10.0
Diagnostic delay		n=48 (of total treatment delay)	
	Health sector delay(lack of DMCs)	34	70.8
	Poor KAP about TB diagnosis	5	10.4
	Others	9	18.75
Treatment delay		n=13 (of total treatment delay)	
	Poor KAP about DOTS (ATT)	8	61.5
	Going for second opinion afterbeing diagnosed	5	38.5
	Others	Nil	

As Table 3 shows that the possibility of causes for delay in diagnosis are health sector delays (distant locations or lack of DMCs)70.8%,followed by poor KAP about TB disease, diagnosis and its treatment resulting in 60%of treatment initiation delays, followed by going for second opinions after being appropriately diagnosed (38.5%).the common reasons for delay from patient sides were distant locations of public health sectors(50.8%), and first point of contact for nearly half being informal, private sectors(40.1%).all these above described factors leading to a total treatment delay of >30days for a newly diagnosed sputum positive pulmonary tuberculosis patient.

Table 4: Showing Association of Study Variables with Delay

Socio-demographic profile	Variables	Frequency (n=134)	Median	P-value
Gender	Male	117	24.2	<0.05
	Female	47	21.3	
Socio-economic status	Below Poverty Line	88	34	<0.01
	Above Poverty Line	46	21.4	
Education	Literate	125	77.2	<0.05

	Illiterate	30	22.8	
Family type	Nuclear	76	36.2	0.41
	Joint	58	28.1	
Occupation	Daily wage labour	60	26.2	<0.05
	Professional	62	33.1	
	Unemployed	12	29.8	

As shown in Table 4 that the socio-demographic factors like majority of male patients (p=<0.05), belonging to below poverty line status (*p*<0.01), and being illiterate (0.05) study subjects working as professions showed a statistically significant association with total treatment delay

Discussion

According to RNTCP with delay in diagnosis and treatment initiation, severity of tuberculosis disease has raised leading to increase in mortality. Hence this study was undertaken to know the total time delay and also describe the factors associated with that in our study setting. Among the 134 study participants, almost half of them were in 20-40 years, males (70%), belonging to nuclear family(56%) having BPL card (65.3%) and Hindu (71%) by religion working as professionals (46.4%) &daily wage workers (44.3%) which is similar to the findings to the study done by Prabhunatti S *et al.*[12] showing majority (62.1%) of the patients being male stating it to be male preponderance in this disease, with possible reasons being having habits like smoking, consumption of alcohol, chewing of tobacco and many more. In our study the total treatment delay (median) is 40days with IQR:5, which is high in comparison with a study by Patki, *et al.*[1] There are study results of a systematic review by Sreeram reddy *et al.*[11] with median total delay of 55.3 days which is higher in comparison with our study and Kiwuwa MS *et al.*[13] showing median total delay in patients attending national referral hospital, Mulago was 12weeks (84 days) which is double the results of total delay of our study, the possible reason for such a difference in delay can be literacy levels and area of residence (geography) making health care more accessible.

Among the median total delay of 40 days, major part of it was contributed by diagnostic delay consisting a median diagnostic delay of 25 days IQR13 in our study. Which is similar toresults of study by Patki *et al.*[1] having median diagnostic delay of 30 days being most days in total treatment delay, but higher in comparison with the findings of Kiwuwa MS *et al.*[13], showing health service delay to be more than 4 weeks. The median treatment delay in our study was 7 days which is higher thanresults of study by Patki *et al.*[1] having mediantreatment delay of 2.1 days, and lesser than results obtained by Virenfeldt J *et al.*[14](median treatment delay:12.1 days) and Iilangovan K *et al.*[15] (median treatment delay:14 days).

The reasons which described the total treatment delay of 40 days in our study are in consistent with the findings in systematic review given by Satyanarayan S *et al.*, [16] that majority of patients approaching private health sector (40%) other than RNTCPwere the residents of rural areas, Studies by Hazarika I.[4] and Kar M *et al.*[17] showing that 50% and 20% of population are preferringprivate sector as their first point of contact for seeking health care (TB) in comparison with our study.There was significant association between illiteracy and treatment delay (<0.05), giving a proxy indicator for unsatisfactory knowledge about the TB disease and DOTS, which is similar to the findings of study by Biya O *et al.*[18] and Virenfeldt J *et al.*[14]showing the poor knowledge of disease and low level of education are significantly associated with patient delay respectively. These findings were in contrast to the results obtained by Patki *et al.*[1] showing no significant association between education status and treatment delay.

Conclusion

The delay in treatment initiation of TB was defined and estimated as Patient delay, diagnostic delay and treatment delay, out of these three delays, diagnostic delay was found to be major contributing in total. It's worthy to note that more than half of study subjects preferred private health sector as first level of seeking health care and also as second opinions even after established diagnosis adding more burden to delay in treatment and severity. To conclude more KAP sessions along with health education regarding DOTS (under RNTCP) among patients has to be done more frequently. Public private partnership with active involvement of case worker for timely reporting of suspected TB cases and complete follow-up till treatment completion is must.

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Conflict of interest

None declared.

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