Delays Affecting Outcome of Tuberculosis Patients: A Quantitative Survey in a Backward District of West Bengal, India

Sumana Samanta[1], Kalpana Kumari[2], Uttam Kumar Das[3], Baisakhi Maji[4]

[1]Assistant Professor, Community Medicine, Heritage Institute of Medical Sciences, Varanasi, UP, [2]Asst. Prof, Community Medicine, Heritage Institute of Medical Sciences, Varanasi, UP, [3]Chief of Lab, Dr Lal Path Labs, Shillong, Meghalaya, [4]Asst. Prof, ID & BG Hospital, Beliaghata, Kolkata, West Bengal

Abstract

Background: Delay in diagnosis and treatment of TB patients increases infectivity of disease in community, more complications and higher risk of death. **Objectives:** To assess magnitude of different types of delay in diagnosis and treatment of TB and to find out its association with treatment outcome. **Methods**: A descriptive cross-sectional study was conducted in Lokepur Tuberculosis Unit of Bankura, West Bengal from July 2016 to June 2017. Simple random sampling was adopted to select 50% of the DOTS centers under that Tuberculosis Unit. Complete enumeration of adult TB patients receiving Cat I treatment and registered from June to October 2016 was done from selected DOTS centers. Exit interview of the patients was conducted using pretested predesigned questionnaire and treatment outcomes were recorded from TB register. Data were entered in MS Excel spread sheet and analysed by SPSS 22.0 version. **Results:** Mean TB patient delay, diagnostic delay and treatment delay were 19.53 days, 18.54 days, 5.17 days respectively. All types of delay were significantly associated with unfavourable treatment outcome. **Conclusion:** Increasing knowledge of first care giving person, monitoring and supportive supervision at all level of healthcare delivery are the steps needed at this hour.

Key words: *TB patient delay, health system delay, Treatment outcome, DOTS*

Introduction

Tuberculosis (TB) is one of the top 10 causes of death and the leading cause from a single infectious agent. It is a major public health problem, particularly in the low- and middle-income countries.[1] India ranked first among the high burden countries, despite achieving the targets of case finding rate 70% and treatment completion rate of over 85%.[2]

Delays in diagnosis and treatment of TB cases are major impending factors in the control of TB.[3] In 2016 there were 89,814 cases registered under Revised National Tuberculosis Control Program in West Bengal.[4] In spite of administering DOTS at a time and place convenient to the patient, 4162 cases were registered in 2016 in Bankura district of West Bengal.[4]

Early diagnosis of the disease and prompt initiation of treatment are essential for an effective TB control program.[5] Like any other illness, private and informal Health Care Providers (HCPs) are often the first care seeking person and these patients moves from one HCP to another before they are finally diagnosed and started on anti TB treatment.[6] Delay in diagnosis may worsen the disease, increases risk of death and enhances tuberculosis transmission in the community.[7] A single infectious person who remains untreated can infect 10-15 people every year, spreading the infection in the community.[1,8]

Corresponding author:
Dr Sumana Samanta
Heritage Institute of Medical Sciences, Dept. of Community Medicine, Varanasi, UP, Pin- 221311;
Mobile: +91-9062068920,
Email: dr.sumana.samanta@gmail.com

After extensive literature search, delay of diagnosis and treatment of TB had been found yet to be explored in Bankura district of West Bengal. Bankura district is economically under developed and is one of the backward districts of West Bengal. With this back drop the present study had been conducted in a tuberculosis unit (TU) of Bankura to assess the magnitude of different types of delay in diagnosis and treatment of TB and to find out its association with treatment outcome.

Methods

A descriptive, cross-sectional study was carried out in 2016-17 at Lokepur TU which is located within the campus of Bankura Sammilani Medical College. It was covering 3.5 lakh population [9] and controlling 44 DOTS centres. All the adult (≥ 15 years) Tuberculosis patients registered in Lokepur TU of Bankura and receiving Cat I treatment constituted the study population. Among the 44 DOTS centers, 50% were selected by simple random sampling (SRS). Then complete enumeration of all the adult TB patients receiving Cat I treatment in intensive phase and registered under Lokepur TU from June to October 2016 was done from the selected DOTS centers.

One study conducted in East Sikkim; the prevalence of total diagnostic delay was 58.2%. [10] After applying the formula $n= (Z^2 p q)/l^2$ we got n= 94 [Where Z=1.96, p=0.58, q=1-p=0.42, l=absolute precision, that was assumed 10%], considering 10% nonresponse rate n= 94+9.4 ≈ 104. According to inclusion criteria, number of patients receiving Category I treatment from 22 DOTS centers and registered from June to October, 2016 under Lokepur TU was 115 (which became the final sample size).

Study tool was pre-designed, pre-tested interviewer administered questionnaire containing both open and close ended questions. Language validation was done by language experts and content validation was done by faculty members of Community Medicine Department, BSMC.

Pretesting was done on 20 adult patients receiving Cat I treatment under Amarkanan TU fulfilling the same criteria of sample population. Ethical clearance was taken from the Institutional Ethics Committee of Bankura Sammilani Medical College. Chief Medical Officer of Health, Bankura and District Tuberculosis Officer were informed regarding the study. Before starting the interview, verbal informed consent was taken from all participants.

The data were collected by exit interview of the patients and by review of records. Interviews were conducted on DOTS days from July, 2016 to November, 2016. All the patients had their treatment outcome by May, 2017 and these outcomes were obtained from TB register of Lokepur TU.

Data were entered into Micro Soft (MS) excel spread-sheet. Analysis was done in statistical software SPSS 22.0 version. Mean, Standard deviation and proportion were calculated for descriptive statistics. Relationship between the different types of delay and treatment outcome was calculated by bivariate analysis like- Chi square tests (two tailed). In these statistical tests p value ≤ 0.05 with 95% confidence interval was considered significant. Binary Logistic Regression was done to find out the inter-relationship of different variables as well as to assess the determinants of treatment outcome while adjusting all the possible confounders.

Selected definitions

1st delay - TB patient delay, 2nd delay - TB diagnostic delay, 3rd delay - TB treatment delay[11]

Operational definition

TB patient delay - if the duration was > 14 days

TB diagnostic delay - if the duration was > 7 days

TB treatment delay - if the duration was > 7 days

Family Size: Large - ≥ 5 family members, Small- < 5 family members

Results

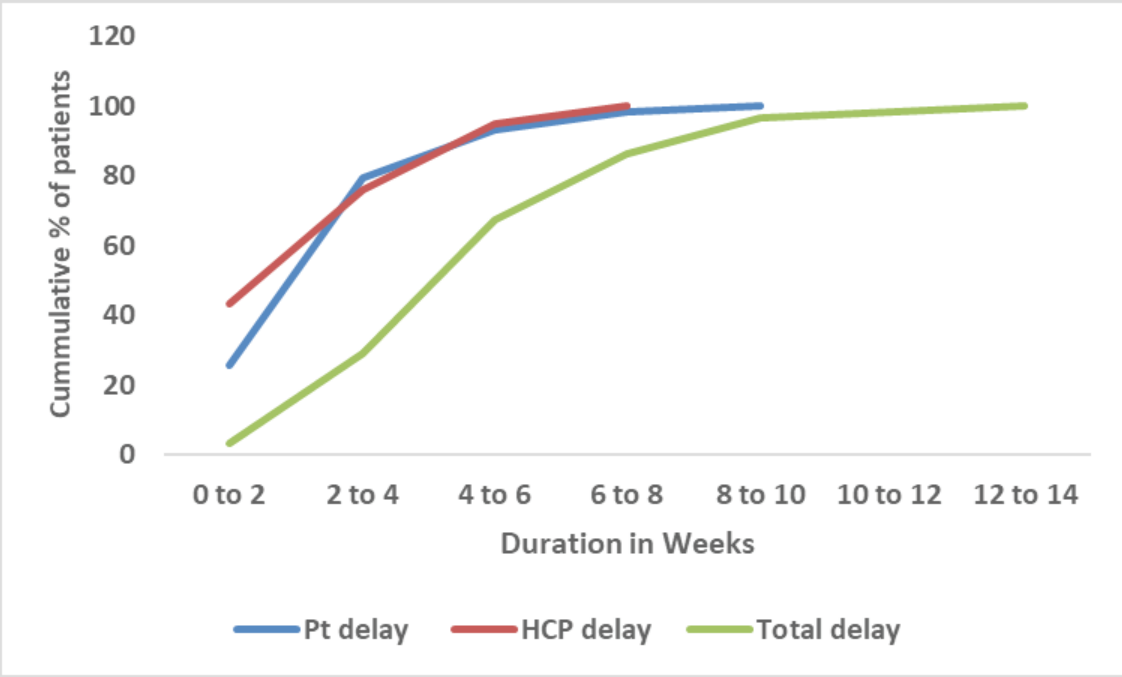
Almost 90% patients belonged to productive age group (15-59 years). Proportion of male was more than female patients. About 62% patients belonged to SC, ST and OBC. Almost half of the patients were illiterate and labourer by occupation. Nearly 46% of the patients belonged to large family. Most of the patients (93%) belonged to lower socio-economic status according to updated and modified B G Prasad Scale 2016. History of substance abuse was there in nearly 75% patients.

The average time interval from appearance of symptoms to seeking care first time was 19.53±10.64 (mean ± SD) days, average time interval from care seeking first time to confirmation of final diagnosis was 18.54±12.08 (mean ± SD) days and average time interval from confirmation of diagnosis to initiation of treatment was 5.17±3.73 (mean ± SD) days.

Almost half of the patients (49.6%) went to health care providers other than the government for their initial symptoms. Those were private healthcare providers (26.1%), traditional healers (12.2%) and medicine shop personnel (11.3%). Almost 36% patients had delay in seeking care first time from any source after the appearance of symptom. Majority of the patients (68.4%) thought it was a simple cough and cold and delayed in seeking care first time. TB patient delay was more among the females (48%) than the males (26.2%) and the difference was statistically significant (χ^2 value 5.87 at df 1, p value 0.015).

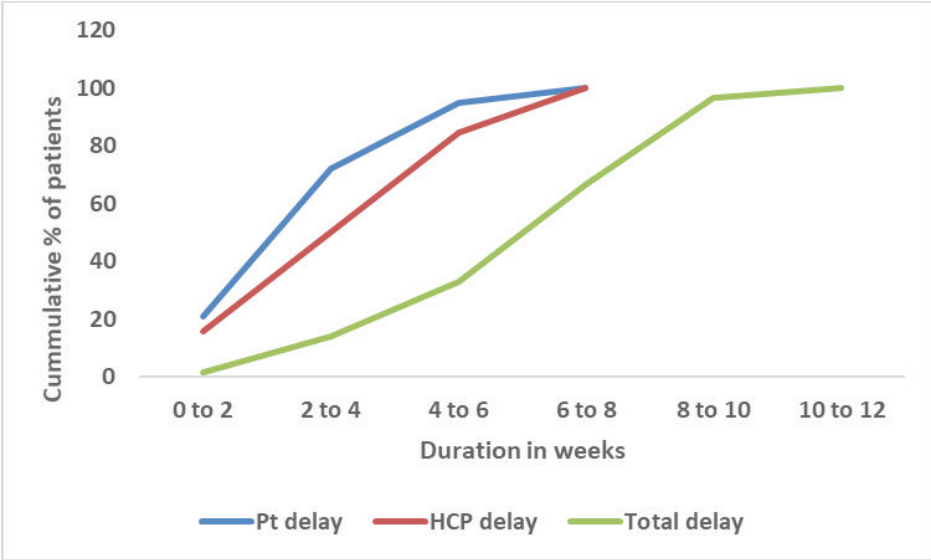
Majority of the patients (70%) had diagnostic delay. Mostly this delay was for getting confirmed report of biopsy in case of extra-pulmonary TB. Most of the patients (88.7%) received confirmed final diagnosis at Government health facility. Almost half of the patients (49.6%) had TB treatment delay. Majority of the patients (91.3%) received first treatment from the same place of present treatment. Lack of money was the main cause for transferring patients from another place to present center for getting ATD.

Association with first care seeking person were further analyzed by comparing the distribution of delay periods (Fig. 1a & 1b). About 33% patients who initially visited public health care providers had been detected started treatment within 4 weeks compared to 14% who initially visited others (p value 0.027). In case of health care provider delay (HCP), 43% who initially visited public sector had no delay compared to 16% who initially visited others (p value 0.002). However, regarding patient delay there was no significant difference between the two groups.



Pt- patient, HCP- Health Care Provider

Fig 1a: Cumulative proportion of patient, health care provider & total delay among new Tuberculosis patients who initially visited public health care providers



Pt- patient, HCP- Health Care Provider

Fig 1b: Cumulative proportion of patient, health care provider & total delay among new Tuberculosis patients who initially visited Others (private practitioners, traditional healers, medicine shop personnel)

In Lokepur TU, Cure rate was 53.1% and treatment completion rate was 33.9%. So, treatment success rate of Cat I TB patients was almost 87%. On the other hand, 7.8% were lost to follow up, 3.4% was not evaluated and death rate was 1.8%.

Treatment success rate was more among the patients who did not have patient delay also who did not have diagnostic delay and treatment delay (Table 1). It was revealed in binary logistic regression that treatment success was statistically associated with education and TB treatment delay while adjusting the effect of other variables. Literate patients had higher rate of treatment success; one-unit increase of literacy status would increase treatment success by 2.24 units. When there was no treatment delay success rate was higher, one unit decrease of treatment delay would increase treatment success by 2.07 units (Table 2).

Table 1: Distribution of patients according to different types of delay in TB and treatment outcome (n=115)

Different types of delay in TB		Treatment outcome		Total	Statistics	p value, df
		Success	Others*			
		No. (%)	No. (%)	No. (%)		
TB patient delay	Present	32(78)	9(22)	41(100)	Chi square test	0.035,1
	Absent	68((91.9)	6 (8.1)	74(100)		
TB diagnostic delay	Present	66(82.5)	14(17.5)	80(100)	Fisher's exact test	0.036,1
	Absent	34(97.1)	1(2.9)	35(100)		
TB treatment delay	Present	46(80.7)	11(19.3)	57(100)	Chi square test	0.048,1
	Absent	54(93.1)	4 (6.9)	58(100)		

*****Includes lost to follow up, not evaluated & death

Table 2: Logistic regression showing association between the factors affecting treatment outcome (n=115)

Variables	Category	Sample size	% of Treatment success	β	Sig.	AOR	95% CI for AOR	
							Lower	Upper
Age	≤50 years	88	90.9	1.49	0.06	4.43	0.90	21.70
	>50 years	27	74.1			1	*	*
Gender	Male	65	81.5	1.19	0.15	1	*	*
	Female	50	94			3.31	0.63	17.34
Education	Illiterate	68	80.9	2.24	0.02	1	*	*
	Literate	47	95.7			9.39	1.42	62.13
Family size	Large	53	79.2	1.45	0.07	1	*	*
	Small	62	93.5			4.29	0.88	20.87
1st care giving person	Others	57	80.7	0.76	0.31	1	*	*
	Govt. health care providers	58	93.1			2.21	0.47	10.36
TB patient delay	Present	41	78	1.23	0.10	1	*	*
	Absent	74	91.9			3.45	0.76	15.64
TB diagnostic delay	Present	80	82.5	1.93	0.09	1	*	*
	Absent	35	97			6.89	0.72	65.97
TB treatment delay	Present	57	80.7	2.07	0.023	1	*	*
	Absent	58	93.1			7.96	1.33	47.53

Discussion

Present study revealed that average time interval from appearance of symptoms to seeking care first time was 19.53±10.64 (mean ± SD) days. Similar finding was shown by Ananth Krishnan et al[12] and Thakur et al[13]. But Purty et al[14] showed higher (mean- 59.3 days) patient delay in their studies in Puducherry. The first point of contact was a governmental health centre for 50.4%

patients in the present study, more or less similar result found in the studies conducted by Ananth Krishnan et al[12], Selvam[15] and Yamasaki-Nakagawa et al[16].

Average time interval from care seeking first time to confirmation of final diagnosis was higher in the studies conducted by Thakur et al[13] and Purty et al[14] as compared to the present study. Lesser treatment delay (mean ± SD – 1.74±2.87) was found by Thakur et al[13] and quite higher treatment delay (mean± SD- 24.5±2.2) was shown by Purty et al.[14]

Regarding treatment success rate, present study showed higher rate than the study conducted by Lanjewar et al[17] (77.78%) and lesser than the study conducted by Saha et al[18](94.1%). Success rate was 3.5 times more for the patients who belonged to lower age group (95% CI was 1.13-10.79). Similarly, Gaur et al[19] showed treatment success rate decreased in the older age group. Present study revealed female patients had higher success rate but Ahmed et al[20] found higher cure rate in males.

Significant association between all types of delay and unfavorable treatment outcome found in the present study. Similar finding was shown by Fatumo et al[21] in Birmingham, Gebreeqziabher et al[22] in Northwest Ethiopia and Virenfeldt et al[23] in Guinea-Bissau.

Conclusion & Recommendations

Intensive effort should be given to increase the literacy status of the population. Educational reforms are needed to focus on the children of lower socio-economic strata. Priority should be placed on women, Scheduled Castes and Scheduled Tribes and other weaker sections of society, who comprise the bulk of illiterate population in India.

Increasing knowledge of the first care giving persons is urgently needed to avoid delay in confirmed diagnosis and treatment. Monitoring and supportive supervision is needed at all the level of health care delivery to avoid health system delay in diagnosis and initiation of treatment of TB.

Conflict of Interest: None declared

Source of Funding: Nil

References

1. World Health Organization. Tuberculosis fact sheet. Available at http://www.who.int
2. World Health Organization. Global tuberculosis report, 2014. Available at https://www.who.int/tb/publications/global_report/gtbr14_ executive_ summary.pdf
3. Almeida CPB, Skupein EC, Silva DS. Healthcare seeking behaviour and patient delay in TB patients. Cad. Saude Publica, Rio de Janeiro.2015;31(2):321-330. Available at https://pdfs.semanticscholar.org/7e3b/8873fe5e5fb76626648bead55e0906176209bf.pdf
4. West Bengal. State Bureau of Health Intelligence Directorate of health Services. Health on the March 2015-2016. Available at https://www.wbhealth.gov.in/other.../Health%20on%20the%20March,%202015-2016.p...
5. World Health Organization. Global tuberculosis report, 2012. Available at https://www.who.int/tb/publications/global_ report/gtbr12_main.pdf
6. Hazarika I. Role of private sector in providing tuberculosis care: evidence from a population-based survey in India. J Glob Infect Dis. 2011;3(1):19. Available at https://www.ncbi.nlm.nih.gov/pubmed/21572604
7. Natesan M, Chauhan RC, Cherian J, Purty AJ, Singh Z, Joice S et al. Patient and health system delay among new pulmonary tuberculosis patients diagnosed at medical college hospitals in Puducherry, India. Int J Res Med Sci. 2015;3(1):88-93. Available at https://www.msjonline.org/ index.php/ijrms/article/view/1230/1180
8. Odusanya OO, Babafemi JO. Patterns of delays amongst pulmonary tuberculosis patients in Lagos, Nigeria. BMC Public Health 2004; 4:18. Available at https://www.ncbi.nlm.nih.gov/pubmed/15169548
9. Population census 2011. Available at: http://www.census2011.co.in/data/village/326879-uttarbankati-west-bengal.html
10. Das S, Basu M, Mandal A, Roy N, Chatterjee S, Dasgupta A. Prevalence and determinants of delay in diagnosis of pulmonary tuberculosis in Darjeeling district of West Bengal. J Family Med

Prim Care 2017; 6:627-35. Available at http://www.jfmpc.com/article.asp?issn=2249-4863;year=2017;volume=6;issue=3;spage=627;epage=635;aulast=Das.

11. USAID. Reducing delays in TB diagnosis: Data collection tools to evaluate the cause and frequency of TB delays. America; 2011 April. Available at pdf.usaid.gov/pdf_docs/PA00KG6B.pdf
12. Ananthakrishnan R, JeyaRaJu AR, Palani G, SathiyaseKaRan BWC. Care Seeking Behavior of the TB Patients who were registered in an Urban Government Tuberculosis Control in Chennai, Tamilnadu, India. Journal of Clinical and Diagnostic Research. 2012 August; 6(6): 990-993. Available at www.jcdr.net/articles/PDF/…/3913_E(C)_PF1(R)_F(P)_PF(V)_PFA%20(H)_PFA(P).p...
13. Thakur R, Murhekar M. Delay in diagnosis and treatment among tb patients registered under RNTCP Mandi, Himachal Pradesh, India, 2010. Indian Journal of Tuberculosis. 2013; 60: 37 – 45. Available at medind.nic.in/ibr/t13/i1/ibrt13i1p37.pdf
14. Purty AJ, Chauhan RC, Natesan M, Cherian J, Singh Z, Sharma Y. Patient and health system delays among adult smear-positive tuberculosis patients diagnosed at medical colleges of Puducherry in south India. Indian J Public Health 2016; 60: 77-80. Available at http://www.ijph.in
15. Selvam JM, Wares F, Perumal M, Gopi PG, Sudha G, Chandrasekaran V et al. Health seeking behaviour of new smear-positive TB patients under a DOTS programme in Tamil Nadu, India. Int J Tuberc Lung Dis. 2007; 11(2): 161-7. Available at www.iapsmupuk.org/journal/index.php/IJCH/article/download/349/pdf
16. Yamasaki-Nakagawa M, Ozasa K, Yamada N, Osuga K, Shimouchi A, Ishikawa N et al. Gender difference in delays to diagnosis and health care seeking behaviour in a rural area of Nepal. Int J Tuberc Lung Dis. 2001 Jan; 5(1):24-31. Available at http://www.ncbi.nlm.nih.gov/pubmed/11263512
17. Lanjewar B, Bhawalkar J, Jethani S, Dhone A. Evaluation of treatment outcome of tuberculosis patients in the urban field practice area of D. Y. Patil Medical College, Pimpri, Pune. Ind J Comm Health 2014; 26(3):238-242. Available at www.iapsmupuk.org › Home › Vol 26, No 3 (2014) › Lanjewar
18. Saha TK, Chattopadhyay A , Sain S, Boral K, Yasmin S, Basu R. Journal of Dental and Medical Sciences. 2013; 6(3): 63-67. Available at www.iosrjournals.org
19. Gaur SN, Dhingra VK, Rajpal S, Aggarwal JK, Meghna. Tuberculosis in the elderly and their treatment outcome under DOTS. Indian J Tuberc. 2004; 51: 83-7. Available at medind.nic.in/iaj/t07/i4/iajt07i4p292.pdf
20. Ahmed F, Shrotriya VP, Gupta SB, Kariwal P, Imtiaz D. A Study on Treatment Outcome of Tuberculosis Patients Registered at Tuberculosis Unit (TU) in Bareilly [U.P.], India. International Journal of Current Medical and Applied Sciences. 2013; 6(3): 174-176. Available at www.ijcmaas.com/pdffileDownload?id=200
21. Fatumo AA. Factors associated with tuberculosis treatment outcomes and treatment delays in Birmingham. Available at https://researchbcc.files.wordpress.com/2014/10/fatumo-final-poster1.pdf
22. Gebreegziabher SB, Bjune GA,Yimer SA. Total Delay Is Associated with Unfavorable Treatment Outcome among Pulmonary Tuberculosis Patients in West Gojjam Zone, Northwest Ethiopia: A Prospective Cohort Study. PLoS One. 2016; 11(7): e0159579. Available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4956157/
23. Virenfeldt J, Rudolf F, Camara C, Furtado A, Gomes V, Aaby P, Petersen E, Wejse C. Treatment delay affects clinical severity of tuberculosis: a longitudinal cohort study. BMJ. 2014; 4: e004818. Available at http://bmjopen.bmj.com/content/4/6/e004818.full