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A Study on Socio-demographic Factors Affecting Treatment Outcome of Patients Registered in a Tuberculosis Unit of Purba Barddhaman District in West Bengal, India.

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Abstract: *Tuberculosis is one of the most globally serious public health problems, despite its causative organism was discovered more than 100 years and highly effective drugs and vaccines are available making tuberculosis a preventable and curable disease. A clinic based, descriptive, cross sectional study was conducted in a rural block of Burdwan district among 180 adult new pulmonary TB patients for duration of 10 months with the objectives of 1. To study the socio-demographic characteristics of the Tuberculosis patients receiving Directly Observed Treatment Short course chemotherapy. 2. To look for the treatment outcome of those patients and the factors that might influence the outcome. Complete enumeration method was used. Results revealed that 72.3 % were males and 27.7% were females; 82.7 % were economically productive age groups (15 – 54) years. General caste and Scheduled Caste were 40.2% and 32.5% respectively. 43.3 % have primary level of education, 35.0% were illiterate or just literate and only 0.6 % was graduate. By occupation 36.1% labourer, 28.9% farmer and 4.4% were dependent and unemployed. 74.4 % were from upper lower class. Majority of the patients were smokers (67.2%). Among 180 patients, 68 (37.8%) were cured, 77 (42.8%) completed their treatment. 3 (1.2%) were reported as treatment failure; 27 (15.0%) were defaulted and 5 (2.7%) died during treatment period. No patient was transferred out during the study period.*

Key words: *Tuberculosis, treatment outcome, Directly Observed Treatment Short Course Chemotherapy, new pulmonary tuberculosis patients.*

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I. Introduction

Tuberculosis (TB) is a world wide, chronic communicable bacterial disease. It is very strange disease because of its varied clinical presentation, host response, chemotherapeutic response, etiology and social implications. It is a very ancient disease and its description has also been found in the ancient Buddhist and Chinese writings.[1] Tuberculosis is also a disease of great antiquity. Even almost certainly tuberculosis lesions have been found in the vertebrae of Neolithic man in Europe and an Egyptian mummies dating possibly as early as 3700 BC.[2] Still, it remains one of the most globally serious public health problems, despite its causative organism was discovered more than 100 years and highly effective drugs and vaccines are available making tuberculosis a preventable and curable disease.[3]

Tuberculosis as a disease of both medical and social dimensions having close relation to poor socio-economic conditions, create multiple burdens for patients, including the necessity to deal with pain, suffering, reduced quality of life, premature mortality, financial costs and familial emotional trauma. TB affects and kills more adults in the productive age group than any other disease thus ultimately society must bear the negative impact of the social consequences created by the combined effects of the disease on patients and their families.[4,5,6,7]

Tuberculosis has been reported as one of the most important public health problems by all regions of WHO. Using surveillance and survey data to update estimates world wide approximately 8.8 million new cases of all form of TB occurring annually and more than 1 lakh people die from it in year 2010.[1] On an average 128 per 1 lakh TB case occurred of which 60 per lakh were smear positives, out of this 24 per lakh reported to be died in 2008.[2,5]

Tuberculosis remains the leading infectious cause of death in India. 1.98 million cases occur annually, 0.87 million have sputum positive pulmonary TB accounting for 21% of the world TB cases and two-thirds of the cases in the South East Asian Region. In 2009 TB causes 2.8 lakh deaths. This makes India the highest TB burden country in the world. Everyday about 20,000 people become infected, more than 5000 develop TB and more than 1000 die due to the disease. Every smear- positive person, if left untreated, has the potential to infect 10-15 persons per year. In other words, two persons become sputum-positive for TB and one person is dies every minute due to the disease (WHO 2008).[2,5] In West Bengal, in the year 2012, cure rate was 83%, new smear positive cases were 43838.[5] 1000 people die due to TB disease and 8 million productive work days are lost due to TB. In Burdwan district, new case detection rate 68% (4th Qtr2013), cure rate 86% in 2012.[5]

The National Tuberculosis Control Programme (NTCP) was launched in 1962 but could not produce the desired results. So some revisions of the NTCP were needed. As a result, in 1992 the programme was revised jointly by WHO and Govt. of India. The Revised National Tuberculosis Control Programme (RNTCP) has been implemented in phases since 1993, guided by WHO and supported by World Bank. RNTCP continues to be integrated with general health services.

RNTCP uses Directly Observed Treatment, Short Course Chemotherapy (DOTS) strategy, DOTS implies that an observer watches the patient swallow the medicine with the aim of improving patient compliance, which is considered most serious problem in TB control.[5] Treatment success under RNTCP has increased, studies shown during the year 2011 - New sputum positive case detection rate of 64% and treatment success rate of 86% was achieved. [5]

Despite this achievements, access to tuberculosis diagnosis and treatment services still remain a major concern for tuberculosis control program of India. Various factors such as age, gender, poverty, illiteracy, alcohol in rural India further complicate the problem. [8]

Moreover thorough search of literature could reveal very few studies in this matter in Burdwan district of West Bengal. Under these circumstances the present study is an attempt to assess the factors affecting treatment outcome of patients receiving DOTS in a Tuberculosis Unit (TU) of Burdwan District in West Bengal With the Objectives to study the socio-demographic characteristics of the Tuberculosis patients receiving DOTS and to look for the treatment outcome of those patients and the factors that might influence the outcome.

II. Materials and Methods

The clinic based observational and Cross-sectional study was carried out for a total period of 10 months i.e. from January 2014 to October 2014 at Bhatar Tuberculosis Unit (TU), situated at Chittaranjan Rural Hospital in Bhatar Block of Burdwan district, West Bengal, is the rural training centre of Burdwan Medical College. Bhatar TU having 5,00442 lakh population (census 2011) [5] consists of two BPHCs (Bhatar and Monteswar). There are 38 Subcentres in Bhatar Block and 32 in Monteswar Block. These 70 SCs act as DOTS centres. Before starting of data collection, planning for study like preparation of interview schedule and pretesting of proforma was done. Then all data were collected by interviewing all adult new pulmonary TB patients, registered under Revised National Tuberculosis Control Programme during January 2014 to March 2014 in the said TU, so that the treatment outcome of those patients would be available by next 6 to 7 months time. Complete enumeration of all adult new pulmonary TB patients, who were registered during the period 1st January 2014 to 31st March 2014 and who had their treatment outcome within October 2014, was done. By considering inclusion and exclusion criteria, sample size became 180. Patients who were deaf and mute, mentally ill and critically ill were excluded. During January 2014 to March 2014, total 199 patients were registered, among them 4 were paediatrics, 9 extra-pulmonary, 5 Category II and 1 were critically ill patients (admitted).Thus total sample size became 180. Interview schedule was pretested on 10 patients and then modified accordingly. Informed written consent was taken from all participating patients before the start of interview, after explaining them the study purpose. They were interviewed during the observation period after consumption of medicines.

Data were collected regarding age, sex**,** religion**,** caste**,** marital status**,** literacy status**,** occupation, per capita monthly income, type of family and treatment outcome of patients – cured, treatment completed, treatment failure, defaulter, transferred out and died. Accuracy of data was improved by checking tuberculosis treatment card of patients and other relevant records such as tuberculosis identity card of patients, tuberculosis register. All the patients were interviewed in the intensive period and following information regarding socio-demographic characteristics such as age, sex, religion, caste, marital status, education, occupation, income, smoking habits etc. were recorded. Treatment outcome of patients were recorded by reviewing of treatment cards and other relevant documents such as tuberculosis identity card of patients along with TB register.

Data was compiled in the computer using excel sheet and analyzed using proportion and Chi-square test with the help of SPSS software version 17.0. Chi square test was used to find out the association between different variables. A p value of <0.05 was taken as significant.

Ethical consideration:

Study was conducted after getting permission from institutional review board of Burdwan Medical College, Chief Medical Officer of Health, Burdwan District and District Tuberculosis Officer of Burdwan District.

Conflicts of Interest: Nil

III. Results

In this study, majority (82.7 %) of the TB patients were economically productive age groups(15 – 54 yrs). TB was more common among males (72.3 %) than the females. Majority (73.3 %) of the patients were Hindus. General and Scheduled Caste were 40.2% and 32.5% respectively. Majority (84.4 %) of the patients were married. TB was more common (52.8 %) among patients belonged to joint family. By education, 43.3 % were primary level of education, 35.0% were illiterate or just literate and only 0.6 % graduate. Out of 180 patients, Labourers were (36.1%), farmers (28.9%), by occupation and 4.4% were dependent and unemployed. It was observed that majority of the patients were smokers (67.2%).(Table 1.) In respect to treatment outcome, among 180 patients, 68 (37.8%) were cured, 77 (42.8%) completed their treatment, 3 (1.2%) reported as treatment failure, 27 (15.0%) defaulted and 5 (2.7%) died during treatment period. No patient was transferred out during the study period (Table 2.). Significantly, cure rate (23.5%) was equal among 15-24 years and 25-34 years, defaulter rate (33.4%) was higher in 45-54 years and death rate (60%) was higher in 25-34 years age group. It is statistically significant. (χ^2=15.84 d f = 4 ,p=0.003,p=0.003)

Cure rate (64.7%) and treatment completion rate (74 %) were more among males. Cure rate (75 %) and treatment completion rate (72.7 %) were higher among Hindus but death rate (60 %) was higher among Muslim. Treatment completion rate (48.2 %) was higher among General Caste but defaulter rate (57.1%) was higher among Scheduled Tribe. Treatment failure (50%) and death rate (50%) were equal among General and Scheduled Caste. Cure rate (80.9 %) and treatment completion rate (88.3%) were higher among the married but treatment failure rate (66.7%) was higher among the unmarried.

Patients, belonged to joint family have higher cure rate (55.9 %) and treatment completion rate (54.5 %) but defaulter rate (62.9 %) was higher among patients of nuclear family. Cure rate (41.2 %) and treatment completion rate (45.5 %) were higher among patients having Primary level of education while death rate (60 %) was higher among patients who were Illiterate or just literate.

The study revealed that cure rate (35.3 %), treatment failure rate (66.7%) and defaulter rates (74.1%) were highest among labourers. Treatment completion rate (38.9%) was highest among farmers and death rate (60%) was highest among dependent and unemployed. Treatment failure rate (66.7%), defaulter rate (66.7%) and death rate (80%) were higher among patients belonged to upper lower class.

Treatment failure rate (66.7%), defaulter rate (70.4%) and death rate (60%) were higher among smokers (Table 1.).

IV. Discussion

The present study was an attempt to assess the Socio-demographic factors affecting treatment outcome of patients receiving DOTS. Majority of the patients (72.3 %) were males and 27.7% were females (Table-1). Pandit N. *et al* [10] Jaggarajamma K.*et al* [11], Chadha S.L *et a*l [12] and Mukherjee A. *et al* [13] found almost 63 %, 69% , 67.6% males respectively, who were usually earning member of family. Gupta K.B. *et al* [14] revealed, 87.7% were males in his study.

Majority (52.8 %) of the patients were belonged to joint family (Table-1). Bawankule S.*et al* [15] found in Wardha district of central India, majority (58.5%) of the patients were from nuclear family, the reason of small variation is likely due to cultural differences.

Majority of the patients that is 35.0% and 43.3% were illiterate or just literate and have primary level of education respectively and only 0.6 % graduate. Pandit N. *et al* [10] found 50 % were educated upto primary and 23% were illiterate. Gopi P.G.*et al* [16] found 39% illiterate. Chadha S.L. *et al* [12] revealed in their study 39% were illiterate and 3% college education.

Regarding occupation, majority were labourer (36.1%) and farmer (28.9%). About 4.4% were dependent and unemployed where as only 3.3% in service. Bawankule S. *et al* [15] observed in their study out of 81% currently employed, most of them were labourers (39.6%) and farmers (35.8%). Pandit N. *et al* [10] found nearly 50% of patients were labourers, few from either business or Government servant. Sukumara P.*et al* [17] observed in their study 45% were manual labourers.

Regarding socio-economic status, patients belonged to lower, upper lower, lower middle, upper middle classes were 3.3% 74.4 %, 21.7% and 0.6% respectively (Table-1).

Pandit N. *et al* [10] found nearly 81% of patients were from socio-economic class IV and V, lower socio-economic class or say poor. Sukumaran P.*et al* [17] and Chadha S.L. *et al* [12] observed in their studies all patients

(100%) and 82% were from the lower socio-economic stratum respectively. Which were contrast to the present study that may be due well implemented hundred days job scheme in Burdwan district.

Regarding addiction, 67.2% were smokers, 8.9% alcoholic and 1.7% tobacco chewers among males and all females have no addiction (Table-1). Gopi P.G.*et al* [16] observed 41% smokers and 31 % alcoholics. Chadha S.L. *et al* [12] observed two thirds of male were regular smokers while none of the female patients smoked.

significant Cure rate (23.5%) was equal among 15-24 years and 25-34 years, treatment completion rate (35.1%) were higher in 35-44 years, defaulter rate (33.4%) was higher in 45-54 years and death rate (60%) was higher in 25-34 years age group.

Pandit N.*et al* [10] found, majority of death 60% of patients were among productive age group, was similar findings. Kumar M.*et al* [18] revealed in their study, non-compliance was maximum (25.4%) in age group 35-44 years patients. Defaulter rate (85.2%) and death rate (80%) were higher among the males.

Pandit N.*et al* [10] found, 73% deaths were among males, which was similar findings. Kumar M.*et al* [18] revealed in their study, non-compliance were equally prevalent amongst male and female wherein it was 10.4% and 11% respectively. Gopi P.G. *et al* [16] found, defaulter rate (34%) were higher among males, similar to the present findings. Auer C. *et al* [19] found in India, Bangladesh and Malawi, significantly more women completed treatment and treatment default was significantly more common among men in India, was the similar findings. Shargie B.E.*et al* [20] found, less treatment failure rate among female.

Cure rate (75 %), treatment completion rate (72.7 %) were higher among Hindus but death rate (60 %) was higher among Muslim. Kumar M. *et al* [18] found non compliance was higher (14.4%) among Muslims. Cure rate (39.2%) was higher among Scheduled Caste, treatment completion rate (48.2 %) was higher among General Caste. But defaulter rate (57.1%) was higher among Scheduled Tribe. Treatment failure (50%) and death rate (50%) were equal among General and Scheduled Caste.

Cure rate (55.9 %), treatment completion rate (54.5 %) were higher among patients belonged to joint family but defaulter rate (62.9 %) was higher among patients belonged to nuclear family.

Cure rate (41.2 %), treatment completion rate (45.5 %) were higher among patients having Primary level of education while death rate (60 %) was higher among patients who were Illiterate or just literate. Kumar M.*et al* [18] revealed in their study, non-compliance was more prevalent among illiterates (13.9%). Gopi P.G.*et al* [16] found, defaulter rate (39%) was higher among illiterates. All these study findings are almost similar with our study.

The study revealed that treatment failure rate (66.7%), defaulter rate (74.1%) were higher among labourer, treatment completion rate (38.9%) was higher among farmer and death rate (60%) was higher among dependent and unemployed. Gopi P.G. *et al* [16] observed no difference in defaulter rate among employed and unemployed. In the present study death rate was highest among dependent and unemployed, which likely due to lack of family support to get regular treatment.

Treatment failure rate (66.7%), defaulter rate (66.7%) and death rate (80%) all were higher among patients belonged to upper lower class. Kumar M.*et al* [18] revealed in their study, non-compliance was more prevalent among patients belonged to upper class (16%) , which was due to privacy they preferred private health facility.

Cure rate (67.6%), treatment completion rate (66.2%), treatment failure rate (66.7%), defaulter rate (70.4%) and death rate (60%) all were higher among smokers. Kumar M.*et al* [18] revealed in their study, non-compliance was more prevalent among smokers (11.5%). Gopi P.G.*et al* [16] observed, defaulter rate was higher among smokers.

Cure rate (91.2%), treatment completion rate (93.5%), treatment failure rate (66.7%), defaulter rate (88.9%) and death rate (80 %) all were higher among non-alcoholics.

Kumar M.*et al* [18], Jaggarajamma K. *et al* [11] revealed in their study, non-compliance was more prevalent among alcoholics (23.9%) and 21% respectively. Gopi P.G.*et al* [16] found, defaulter rate (34%) was higher among alcoholics, were contrast to the present findings and likely due to few patients were alcoholics in the present study.

V. Conclusion

The present study revealed that TB was more common among of males and among 15 – 54 years, the economically productive age groups, illiterates, labourer and upper lower class of persons. Majority of the patients were Hindus. Among Hindus, majority of the patients belonged to General and Scheduled Caste. Treatment failure rate, defaulter rate and death rate were higher among the males.

Death rate was highest among Muslim, whereas defaulter rate was higher in Scheduled Tribes among Hindus. Higher treatment failure rate was found among the unmarried, which was likely due lack of family support. Patients belonged to nuclear family were more defaulter. Illiterate or just literate, dependent and

unemployed patients experienced more death rates. Highest treatment failure rates, defaulter rate (74.1%) were among labourer. Treatment failure rate, defaulter rate, and death rate were also higher among smokers.

Limitation

1. Some of the questions may not have been fully comprehensible to illiterate patients.
2. Due to time constraint, other factors affecting treatment outcome like awareness and quality of work of health personnel etc. could not be studied.
3. Some patients may have expressed availability of DOTS service as good to please the health personnel.
4. Triangulation of data has not been explored.

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Table-1: Patients distribution according to socio-demographic factors and treatment outcome (n=180)

Socio-demographic factors	**Treatment outcome**					**Total No. (%)**	χ^2 p value
1.Age (years)	Cured No. (%)	Treatment completed No. (%)	Treatment failure No. (%)	Defaulter No. (%)	Died No. (%)		
15-24	16 (23.5)	11 (14.3)	0 (0)	2 (7.4)	0 (0)	29 (16.1)	χ^2=15.84
25-34	10 (14.7)	21 (27.3)	1 (33.3)	2 (7.4)	3 (60)	37 (20.5)	d f = 4
35-44	16 (23.5)	27 (35.1)	0 (0)	6 (22.2)	1 (20)	50 (27.8)	p=0.003.
45-54	9 (13.2)	13(16.9)	1 (33.3)	9 (33.4)	1 (20)	33 (18.3)	
55-64	10 (14.7)	5 (6.4)	0 (0)	2(7.4)	0 (0)	17 (9.4)	
≥65	7 (10.4)	0 (0)	1 (33.3	6 (22.2)	0 (0)	14 (7.9)	
2. Sex							χ^2=4.001,
Male	44 (64.7)	57 (74.0)	2 (66.7)	23 (85.2)	4 (80)	130 (72.3)	d f = 4
Female	24 (35.3)	20 (26.0)	1(33.3)	4 (14.8)	1 (20)	50 (27.7)	p = 0.40
3. Religion							
Hindu	51 (75)	56 (72.7)	2 (66.7)	21 (77.8)	2 (40)	132 (73.3)	χ^2=3.293
Muslim	17 (25)	21 (27.3)	1(33.3)	6 (22.2)	3 (60)	48 (26.7)	d f = 4
							p = 0.51
4.Caste							χ^2 = 2.738
General Caste	18 (35.3)	27 (48.2)	1 (50)	6 (28.6)	1 (50)	53 (40.2)	d f = 4
Scheduled Caste	20 (39.2)	18 (32.1)	1 (50)	3 (14.3)	1(50)	43 (32.5)	p = 0.6.
Scheduled Tribe	10 (19.6)	11 (19.7)	0 (0)	12 (57.1)	0 (0)	33 (25.0)	
Other backward classes	3 (5.9)	0 (0)	0 (0)	0 (0)	0 (0)	3 (2.3)	
5. Marital status							χ 2 = 7.981
Married	55 (80.9)	68 (88.3)	1 (33.3)	24 (88.9)	4(80)	55 (80.9)	d f = 4
Unmarried	8 (11.8)	8 (10.3)	2 (66.7)	2 (7.4)	0 (0)	8 (11.8)	p = 0.09.
Widow and widower	4 (5.9)	0 (0)	0 (0)	1 (3.7)	1 (20)	4 (5.9)	
Separate	1(1.4)	1 (1.4)	0 (0)	0 (0)	0 (0)	1(1.4)	
6. Type of family							χ^2 = 3.381
Nuclear	30 (44.1)	35 (45.5)	1 (33.3)	17 (62.9)	2 (40)	30 (44.1)	d f = 4
Joint	38 (55.9)	42 (54.5)	2 (66.7)	10 (37.1)	3 (60)	38 (55.9)	p = 0.49
7.Education. Level							
Illiterate and just literate	22(32.3)	24 (31.2)	1(33.3)	13 (48.1)	3 (60)	63(35.3)	χ^2 = 8.727 d f = 8,
Primary	28(41.2)	35 (45.5)	1 (33.3)	13 (48.1)	1(20)	78(43.3)	p = 0.36.
Secondary	12(17.6)	15(19.5)	1(33.4)	0 (0)	1(20)	29(16.1)	
Higher secondary	5 (7.3)	3 (3.8)	0 (0)	1 (3.8)	0 (0)	9 (5.0)	
Graduate and above	1 (1.6)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.6)	
8. Occupation							
Service	4 (5.9)	1 (1.2)	0(0)	1(3.7)	0(0)	6 (3.3)	χ^2 = 8.285
Business	8(11.8)	2 (2.6)	0(0)	0 (0)	0(0)	10 (5.6)	d f = 4
Farmer	17 (25.0)	30 (38.9)	1(33.3)	3 (11.1)	1(20)	52 (28.9)	p = 0.08
Labourer	24 (35.3)	18 (23.4)	2(66.7)	20 (74.1)	1(20)	65 (36.1)	
House –wife	9 (13.2)	19 (24.7)	0(0)	3 (11.1)	0(0)	31(17.3)	
Student	2 (2.9)	6 (8.0)	0(0)	0(0)	0(0)	8 (4.4)	

Dependent and unemployed	4 (5.9)	1 (1.2)	0(0)	0 (0)	3 (60)	8 (4.4)	
9. Socio- economic status							
Upper middle	1 (1.5)	0 (0)	0 (0)	0(0)	0 (0)	1(0.6)	$\chi^2 = 8.285$
Lower middle	13 (19.1)	15 (19.5)	1(33.3)	9(33.3)	1 (20)	39 (21.7)	d f = 4
Upper lower	49 (72.1)	61 (79.2)	2 (66.7)	18 (66.7)	4 (80)	134(74.4)	p = 0.08
Lower	5 (7.3)	1 (1.3)	0 (0)	0 (0)	0 (0)	6 (3.3)	
10. Smoking							$\chi 2 = 0.28$
Present	46 (67.6)	51 (66.2)	2 (66.7)	19 (70.4)	3 (60)	121 (67.2)	d f = 4
Absent	22 (32.4)	26 (33.8)	1 (33.3)	8 (29.6)	2 (40)	59 (32.8)	p = 0.9
11. Alcohol addiction							$\chi^2 = 3.686$
Present	6 (8.8)	5 (6.5)	1 (33.3)	3 (11.1)	1 (20)	16 (8.9)	d f = 4
Absent	62 (91.2)	72 (93.5)	2 (66.7)	24 (88.9)	4 (80)	164 (91.1)	p = 0.45

Table-2: Distribution of patients according to treatment outcome.
(n=180)

Treatment outcome	Number	Percentage
Cured	68	37.8
Treatment completed	77	42.8
Treatment failure	3	1.2
Defaulter	27	15.0
Died	5	2.7
Total	180	100.0

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