



# ROLE OF DEMOGRAPHIC FACTORS WITH THE LEVEL OF TREATMENT COMPLIANCE IN DIRECTLY OBSERVED SHORT COURSE CHEMOTHERAPY

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## ABSTRACT

**Background:** Tuberculosis has claimed more lives than any other scourges of the past. It still remains a major public health problem worldwide. It continues to elude the brightest minds and to challenge human and economic resources of the countries around world. Objective of the study was to assess the role of demographic factors with the level of treatment compliance in DOTS.

**Materials and methods:** The present study was conducted at Sri Aurobindo Medical College and Post Graduate Institute in the Department of Community Medicine from tuberculosis unit in an urban area. The data collection was done with the help of semi-structured questionnaire by interview method.

**Results:** 14 patients up to 25 years completed treatment and there were no defaulters. In the age group 25-45 years 37 patients completed treatment in time and 3 became treatment defaulters. Whereas in the age group > 45 years 44 patients completed treatment in time and 8 became treatment defaulters. ( $P < 0.05$ )

Amongst the males 45.16% completed treatment in time and amongst the females 54.83% completed treatment in time.

**Conclusions:** The defaulters were found more in males than females. It was also found 60% families were nuclear and had their own houses and 65% patients were married.

**Keywords:** Demographic factors, compliance, TB, DOTS, Defaulter

## INTRODUCTION

Tuberculosis is one of the most ancient diseases. It has been referred to in the Vedas and the Ayurvedic Samhithas. Tuberculosis has claimed more lives than any other scourges of the past <sup>1</sup>. It still remain a major public health problem worldwide. It continues to elude the brightest minds and to challenge human and economic resources of the countries around world.

Tuberculosis is leading infectious cause of death worldwide being responsible for 3 million deaths annually with 6% of all deaths world wide attributable to tuberculosis. About 95% of tuberculosis cases & 98% of all deaths occur in poor developing countries. <sup>2</sup>India has nearly 30% of global tubercu-

losis burden with an estimated burden of new smear positive tuberculosis of 85 per 1 lakh population, nearly 1 million new smear positive case and 2 million total new cases are added every year. More adults die from tuberculosis than from any other infectious disease in India, one every one and half minute more than 1000 every day.

Timely detection of active infectious patients and providing them an adequate course of therapy to obtain cure is essential for reducing transmission of tuberculosis in community.<sup>3</sup> It has been shown that 1-untreated smear positive tuberculosis patient can infect up to 15 other person in the course of 1-year. It has been known that non-adherence to treatment by patients is a major impediment in control of tuberculosis.

DOTS will also ensure that drugs are taken in right combinations and for appropriate duration of time. One more advantage is, if patient misses a dose he can be traced back immediately and treatment resumed. Thus it will ensure increased case holding and achieve higher cure rates envisaged under the revised strategy of tuberculosis control.<sup>1,4</sup>

The present study was conducted to assess the role of different demographic factors with the level of treatment compliance in DOTS.

**METHODOLOGY**

Indore district is divided into six Tuberculosis Unit out of which four Tuberculosis Unit from the Indore urban area were included in the study. The study was conducted from October 2011 to October 2012. There were 150 patients enrolled in the study. There were 4 patients who were lost to follow up (2 died and 2 transferred out). Prior approval of institutional ethical committee was taken before the start of study.

All patients diagnosed as suffering from Tuberculosis and enrolled under RNTCP, who were re-

ferred to the four Urban Tuberculosis Unit DOTS centre for treatment, were included in the study.

Enrollment period-into the present study was determined according to the category of treatment regimen prescribed by the treating physician. Category I patients were enrolled for 6 months and Category II patients were enrolled for 4 months. This particular arrangement was adopted so as to follow each and every patient enrolled in the study, over complete scheduled duration for different treatment regimens and 4-weeks in addition to compensate for extra-duration that is acceptable under RNTCP.

The profile of the patients enrolled under the study was taken with the help of semi-structured questionnaire by interview method and informed verbal consent was taken.

**RESULTS**

Table 1 shows relation of age with the level of treatment compliance. It was found that the number of defaulters increases with age. (p<0.05)

**Table 1: Relation of age with the level of treatment compliance-**

Age group (In Years)	Treatment completed in time (n=93)	Treatment completed with delay (n=42)	Defaulter (n=11)	Total (n=146)
0-15	05 (83.3)	01 (16.6)	00	06 (4.10)
16-24	07 (87.5)	01 (12.5)	00	08 (5.47)
25-34	22 (75.8)	04 (13.7)	01 (3.4)	29 (19.86)
35-44	15 (65.2)	08 (34.7)	01 (4.3)	23 (15.75)
45-54	20 (68.9)	08 (27.5)	01 (3.4)	29 (19.86)
55-64	14 (50)	10 (35.7)	04 (14.2)	28 (19.17)
>64	10 (43.4)	10 (43.4)	03 (13.04)	23 (15.75)

**Table 2: Role of Socio-demographic variables in the level of compliance with DOTS-**

Socio-demographic variables	Treatment completed in time (n=93)	Treatment completed with delay (n=42)	Defaulter (n=11)	Total (n=146)	P-Value
<b>Gender</b>					
Males	42 (45.1)	20 (47.6)	8 (72.7)	70 (47.9)	0.22
Females	51 (54.8)	22 (52.3)	3 (27.2)	76 (52.05)	
<b>Type of family</b>					
Nuclear	46 (49.46)	36 (85.7)	8 (72.7)	90 (61.6)	0.00
Extended	47 (50.53)	6 (14.28)	3 (27.2)	56 (38.3)	
<b>Housing</b>					
Owned	56 (60.2)	19 (45.2)	4 (36.3)	89 (60.9)	0.12
Rented	37 (39.7)	23 (54.7)	7 (63.6)	57 (39.0)	
<b>Marital status</b>					
Married	62 (66.6)	24 (57.1)	8 (72.7)	95 (65.06)	0.49
Unmarried	23 (24.7)	16 (38.09)	2 (18.1)	43 (29.4)	
Separated/Divorced	8 (8.6)	2 (4.76)	1 (9.09)	8 (5.47)	
<b>Smoking</b>					
Present	37 (39.7)	26 (61.9)	9 (81.8)	72 (49.3)	0.005
Absent	56 (60.2)	16 (38.09)	2 (18.18)	74 (50.68)	
<b>Alcohol</b>					
Present	34 (36.5)	28 (66.6)	7 (63.6)	66 (45.2)	0.003
Absent	59 (63.4)	14 (33.3)	4 (36.6)	80 (54.7)	

**Table 3: Relation of education with level of treatment compliance**

Literacy status	Treatment completed in time	Treatment completed with delay	Defaulter	Total
Illiterate	22 (59.4%)	10 (27.02%)	4 (10.8%)	37 (25.34%)
Primary	18 (69.2%)	6 (23.07%)	2 (7.6%)	26 (17.80%)
Middle	29 (78.3%)	7 (18.9%)	1 (2.7%)	37 (25.34%)
High school	7 (63.6%)	3 (27.2%)	1 (9.09%)	11(7.53%)
Higher secondary	10 (31.2%)	9 (28.1%)	2 (6.2%)	32 (21.91%)
Graduate	5 (55.5%)	3 (33.3%)	1 (11.1%)	9 (6.29%)
Post-graduate	2 (40%)	3 (60%)	0	5 (3.4%)
Total	93 (63.6%)	42 (28.7%)	11 (7.5%)	146

\*p -value 0.645

**Table 4: Relation of socio-economic class with level of treatment compliance-**

Socio economic class	Treatment completed in time	Treatment completed with delay	Defaulter	Total
I	04 (80)	00	01 (20)	05 (3.42)
II	18 (75)	04 (16.6)	02 (8.3)	24 (16.43)
III	26 (57.7)	16 (35.5)	03 (6.6)	45 (30.82)
IV	25 (64.1)	11 (28.2)	03 (7.6)	39 (26.71)
V	20 (60.6)	11 (33.3)	02 (6.06)	33 (22.60)
Total	93 (63.6)	42 (28.7)	11 (7.53)	146 (100)

Table 2 shows the role of gender, type of family, housing, marital status and addiction in the level of compliance with DOTS. The defaulters were found more in males, more in nuclear family, those in rented houses, married and those having the history of smoking and alcohol.

Table 3 shows the relation of education with the level of treatment compliance. The percentages of defaulters were found more in the illiterate population.

Table 4 shows of socio-economic class with the level of treatment compliance. In the present study socio-economic class was not found to be associated with treatment defaulting.

## DISCUSSION

In the present study it was found that number of defaulters increases with age. ( $p < 0.05$ )

Similar observations were recorded by Al-Hajaj MS in Saudi Arabia who found that non-compliance was significantly associated with patients age, younger patients (< 20 years) being at lowest risk and defaulter rate rising with increasing age.<sup>5</sup> But several studies have refuted the association of age with treatment compliance.

In a study done by Md. Salahuddin Ansari et.al, New Delhi in 2011 found that highest rate of non-compliance was observed in patients aged 31-45 years (45%) and lowest rate was found in patients below 14 years (2.5%).<sup>6</sup>

In another study done by Ram Bahadur Nepali in Banke district<sup>7</sup> of Nepal in 2013 found that overall compliance rate was 86.80%. Age -wise compliance pattern was not statistically significant.

The reason behind more default in older patients is mainly the self neglect and neglect by family.

It was also found in the present study that the defaulters were found more in the male population than the females. It was observed that there is no relation of sex with compliance pattern. ( $P > 0.05$ )

A study done by K. Jaggarajamma et.al, in Tiruvallur district, South India in 2007 found that the significant risk factor for default was male ( $P < 0.001$ ).<sup>8</sup> Chhaya Mittal and SC Gupta<sup>9</sup> in 2011 in a cross-sectional study conducted in Agra city observed that male patients defaulted twice as common than females. ( $P < 0.001$ ). In contrast Nepali RB and PaneruDP<sup>7</sup> observed in Banke district of Nepal in 2013 that there is no statistical association in compliance pattern between males and females.

It was found that in some way history of alcohol intake was associated with more number of defaulters than with no history of alcohol intake.

Similarly it was also found from a study done by K. Jaggarajamma et al in 2007 that 27% were defaulters who were alcoholics and 12% were defaulters who were not alcoholics.<sup>8</sup> In another study done by R B Nepali in 2013 found that the compliance was 91% in non-alcoholic patients, and only 8% were compliant who were alcoholics.<sup>7</sup>

Illiterate patients were more likely to interrupt treatment compared to literate patients. The illiterate patients were more often involved in manual work with DOTS timing usually coincided with their working hours.

A higher defaulter rate among illiterate patients also reflects a lack of awareness among them about seriousness of the disease and importance of regu-

lar treatment. This finding is in concordance with study from Indore by Sharma et al and the study from Saudi Arabia but most other studies disagree with association of education and treatment compliance.

In a study done by A Mishra et al in Gwalior in 2006<sup>10</sup> found that 15.07% were illiterate, 14.7% were educated upto 5<sup>th</sup> class, 21.7% were educated upto 8<sup>th</sup> class, 12.17% educated upto 10<sup>th</sup> class, 12.5% educated upto 12<sup>th</sup> class, and 12.5% were graduate and 10.57% were post graduates. In another study by Md.Salahuddin Ansari et al in 2007 found that according to the education level 50% of non-compliant had finished primary school, 37.5% had finished high school, 5% had finished intermediate/post high school and 2.5% were graduated.<sup>6</sup> In another study done by Paudel DP, in 2013 found – 10% of the compliant were illiterate, 10% were literate, 36% had primary education, 24% had secondary education, 20% had higher education.<sup>11</sup> In another study done by K. Jaggarajamma et al in Tiruvallur district South India in 2007 found that 16% of the literate and 20% of the illiterate were defaulters in his study.<sup>8</sup>

In the present study SES was not found to be significantly associated with treatment defaulting.

In a study done by A. Mishra et al in 2006<sup>13</sup> it was found that the majority of cases belonged to lower socio-economic class-IV (27.3%) followed by class V (24.3%). Mansthi NRR et al<sup>15</sup> in their study of effectiveness of DOTS on TB patients treated under RNTCP also reported similar findings. This can be attributed to the fact that the persons of lower socio-economic status live in over-crowded and ill-ventilated houses and localities. In a study done by Paudel DP, in 2013 observed that the income ratio of total patients range from Rs. 300 to Rs.1,00,000 per month. Most of the compliance on tuberculosis was found from the middle level income capacity (<6000).<sup>14</sup>

In another study by Nepali RB in 2013 concluded that with the exception of nil income category, there was directly proportional relationship between the patient's monthly income and compliance rates i.e. increase in monthly income increased the total compliance rate.

In another study done by Md.Salahuddin Ansari in 2011 found that 45% had family income between 2041 and 6100, 6% had family income between <2040, 35% had family income between 6101 and 10160, 2% had family income between 10,161 and 15,280. No patient had family income more than 15,280. It was thus noted that 72.5% of non-compliances were in the upper-lower class, 22.5% of non-compliances in the lower-middle class and 10% of the non-compliances in the lower class. No

patient was in the upper middle or upper class of the family. The socio-economic status was thus found to be a major contributing factor for non-compliance of TB treatment.<sup>9</sup>

## CONCLUSION

It was seen that defaulters were found more in the male population. The difference in treatment compliance is statistically non-significant in relation to the marital status as well as socio-economic status. Defaulters were more in illiterate, nuclear family, those living in rented houses and those consuming alcohol and smoking.

## RECOMMENDATIONS

Periodic training and orientation of DOTs providers to be to re-emphasize importance of initial home visit, initial and ongoing health education, direct observation of treatment, timeliness of follow-up sputum examination and prompt defaulter retrieval action for successful implementation of RNTCP.

## REFERENCES

1. Directly Observed Treatment Short Course: Tuberculosis cure for all ICMR Bulletin, March 2001, Vol .31, No.3, 37-43.
2. Zumla A, Grange J Science Medicine and the future of tuberculosis British Medical Journal, Vol.14, October 1998, 736-765.
3. Nguyen TNL, Wells CD, Binkin NJ, Pham DL, Nguyen VC, the importance of quality control of sputum smear microscopy : the effect of reading of reading errors on treatment decisions and outcome, International Journal of tuberculosis and lung disease 3(6) 483-487, 1999.
4. Leading article-Alternate approaches to improve treatment adhere in tuberculosis control programme, Indian Journal of tuberculosis 1995;42, 67
5. Comolet TM, Rakotomalala R, Rajaonario 11. Factors determining compliance with tuberculosis Madagascar International Journal of Tuberculosis and Lung Disease, 1998 November: 2(11):891-897.
6. Burman WJ, Cohn DL, Rietmeijer CA, Judson FN, Sbarbaro JA, Reves RR, non-compliance with Directly Observed Therapy for Tuberculosis, epidemiology and effect on the outcome of treatment –chest 1997, May: 111(5), 1168-1173.
7. Liefoghe R, Suentense C, Meulemans H, Moran MB and Murfnck AD. A randomized trial of the impact of counseling on treatment adherence of tuberculosis patients in Sialkot, Pakistan. International Journal of Tuberculosis and lung disease, 1999, 3 (12): 1037-1080.
8. Hajjaj MS, The outcome of tuberculosis treatment after implementation of National Tuberculosis Control Programme in Saudi Arabia, Ann Saudi Medicine, 2000; 20 (2): 125-128.
9. Md Salahuddin Ansari et al, The role of socio-economic factors responsible for non-compliance of directly ob-

- served treatment short course among Tuberculosis patients ,Journal of Medicine and Health Sciences; Vol.18,No.2, August 2011.
10. Ref-Nepali RB and Paneru DP, Compliance to Directly Observed Treatment Short-Course (DOTS) Chemotherapy among the patients of pulmonary tuberculosis in Banke district of Nepal, HAS, 2013, Vol 3.No.1, Pg 17-20.
  11. K.Jaggarajamma et al, Reasons for non-compliance among patients treated under Revised National Tuberculosis Control Programme (RNTCP),Tiruvallur, South India, Indian J Tuberculosis 2007;54:130-135.
  12. Chhaya Mittal, S C Gupta, Non-compliance to DOTS: How it can be decreased, Indian Journal of Community Medicine 2011; 36:27-30.
  13. A Mishra et al, A study of effectiveness of DOTS on Tuberculosis patients treated under RNTCP Programme, NTI Bulletin 2007, 43/3&4, 47-50.
  14. Paudel DP, Treatment Compliance of tuberculosis and factors associated in Bhaktapur district, Nepal, JHAS 2010: Vol 1, No. 1, Page 38-43.
  15. Mansthi NRR, Rajana MS, Parauramali BG: A study on the effectiveness of DOTS on tuberculosis patients treated under RNTCP: Indian journal of public health, Volxxxxx (1):2006, 57-63.