# **Original Research Article**

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# Influence of socio demographic factors on noncompliance among patients treated under RNTCP in a rural tuberculosis unit in Karimnagar district

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#### **ABSTRACT**

**Background:** Tuberculosis (TB) remains the number one killer infectious disease affecting adults in developing countries. The 1990 World Health Organization (WHO) report on the global burden of disease ranked TB as the seventh most morbidity-causing disease in the world, and expected it to continue in the same position up to 2020. The objective of this study is to evaluate the socio-demographic factors leading to non-compliance.

**Methods:** The present study is case control study conducted to evaluate socio-demographic characteristics factors for non-compliance among patients treated under RNTCP in a rural tuberculosis unit in Karimnagar District. Among the 394 defaulters, 77 were not available at the address given to the TU during visits for sampling, 15 were not willing to participate and 2 patients were unable to communicate. 300 TB cases who have completed the treatment were taken as controls.

**Results:** Age wise distribution of sample respondents is shown in above table. Most of the respondents 241 (40.2%) belonged to the age group of 31-40 years followed by 136 (22.7%) between age 41-50 years. 398 (66.3%) of them were male and 202 (33.7%) were female among the studied population. majority of the studied sample belonged to rural area 539 (89.8%) as compared to urban area 61 (10.2%).

**Conclusions:** Increasing age with respondents above 40 years were likely to be non-compliant, living in a rural area, having migrated and belonging to low socio-economic status were also significant factors. Living in a nuclear family was also significant due to the lack of familial support. Patients who were tobacco users and consumers of alcohol were likely to be non-compliant. Families with multiple members suffering from TB were likely to have non-compliant patients.

**Keywords:** Tuberculosis, Socio demographic factors, Non-compliance, Rural areas

#### INTRODUCTION

Tuberculosis (TB) remains the number one killer infectious disease affecting adults in developing countries. The 1990 World Health Organization (WHO) report on the global burden of disease ranked TB as the seventh most morbidity-causing disease in the world, and expected it to continue in the same position up to 2020.

There were an estimated 8.8 million incident cases of TB (range, 8.5 million–9.2 million) globally in 2010, 1.1 million deaths (range, 0.9 million–1.2 million) among HIV-negative cases of TB and an additional 0.35 million deaths (range, 0.32 million–0.39 million) among people who were HIV-positive. India ranked first with the largest number of incident cases in 2010 (2.0 million–2.5 million) and alone accounted for an estimated one quarter (26%) of all TB cases worldwide.<sup>2</sup>

Tuberculosis is a chronic condition requiring prolonged treatment. The currently recommended minimum duration of treatment is 6 months, which, although much shorter than the previously recommended 12 to 24 months, is still very long. According to the World Health Organization (WHO), directly observed therapy (DOT) ensures successful treatment of patients with tuberculosis. Some patients fail to adhere to treatment and eventually default before completing the course. Patients whose treatment is interrupted for 2 consecutive months or more, as defined by WHO, are reported as Out of Control' at the end of treatment period. Poor adherence to treatment means that patients remain infectious for longer and are more likely to relapse or succumb to tuberculosis.<sup>3</sup> In addition, erratic or selective compliance to treatment and default could result in treatment failure, foster emergence of drug resistant tuberculosis. 4,5 Many tuberculosis (TB) epidemiologists regard obtaining high compliance levels in the population under treatment as even more important to a community's welfare than finding new cases.6

Non-compliance with the treatment is claimed to be one of the most important problems in the control for tuberculosis. Of tuberculosis patients diagnosed, less than half, under previous programs, completed treatment. It is not an exception for developing country like India. Starting in 1997, revised national tuberculosis control programme was implemented in a phased manner to ensure that quality of services is maintained. By March 2006, entire country has been covered under the programme. 9

There is a tendency that patients who do not complete treatment may continue to infect others in the community as well as developing a relapse of tuberculosis. It is estimated that one infectious patient infects an average of 10-15 people. <sup>10</sup>

Tuberculosis is an example of a disease which involves socio-cultural and economic factors with gender differentials that needs to be further addressed. Gender differentials interplay with many socioeconomic and cultural factors at different levels of tuberculosis from diagnosis of the disease to compliance with treatment and treatment outcome. <sup>10</sup> The factors that influence treatment interruption by TB patients are poverty, unemployment, overcrowding, alcoholism, migration, non-prioritisation of TB, and cultural beliefs/attitudes.

The objective of this study is to evaluate the sociodemographic factors leading to non-compliance among patients treated under RNTCP in a rural tuberculosis unit in Karimnagar district.

### **METHODS**

The present study is a case control study was conducted to evaluate socio-demographic factors for default among patients treated under RNTCP in a rural tuberculosis unit

in Karimnagar district. The study was conducted for a period 6 months, July 2010 to December 2010. The population of Karimnagar district is estimated to be 38 lakh as per 2011 census. Karimnagar is served by 7 TU's namely, Karimnagar Urban, Huzurabad, Jagtial, Kataram, Korutla, Ramagundam and Vemulawada. The seven TU's have a total 4,221 patients of tuberculosis registered among which defaulters number to 461 during the year 2010.

Both cases and controls were enrolled for the study. As per the Government records for the TU's of Kataram, Korutla, Vemulawada, Huzurabad Ramagundam there were 394 defaulters registered during the 4 quarters of 2010. The defaulters were traced to their corresponding addresses and interviews were taken at their residence. All defaulters registered at the rural TU's during 2010 were included in the study. Defaulters not available at address given to TUs, persons not willing to participate, persons unable to communicate were exluded from the study. Among the 394 defaulters, 77 were not available at the address given to the TU during visits for sampling, 15 were not willing to participate and 2 patients were unable to communicate.

Controls were patients selected from the same TU's who had successfully completed treatment. Controls were randomly selected from the list of patients in the TU's by simple random sampling in a 1:1 ratio to obtain the same number of controls as the cases. A semi-structured questionnaire with both open and closed ended questions was used to gather data. Two native Telugu speakers translated the questionnaire into Telugu language, in a way that it could easily be understood and answered. The translated version was then independently back translated from Telugu to English. The questionnaire was pilot tested in a sample of 20 patients in the study and the final version was produced. Informed verbal consent was obtained from the subjects after explaining the purpose of the study and the benefits to the scientific community. The questionnaire was administered to the sample subjects via face to face interview. Responses were recorded by the interviewer. During the entire process, adequate privacy and comfort was ensured.

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) Version 17. Categorical variables were appropriately coded for data entry and measures obtained were percentages, descriptives (mean and standard deviation), charts for data presentation and chi square and Fisher's exact test of significance and p values.

#### **RESULTS**

There were 300 Tuberculosis defaulter cases and 300 Tuberculosis cases who have successfully completed the treatment were taken as controls.

Table 1 shows age wise distribution of sample respondents is shown in above table. Most of the respondents 241 (40.2%) belonged to the age group of 31-40 years followed by 136 (22.7%) between age 41-50 years. Mean age group of the respondents was 42.96±11.67. Age was a significant risk factor for noncompliance among tuberculosis patients.

Above table shows the gender distribution of sample respondents, 398 (66.3%) of them were male and 202 (33.7%) were female among the studied population. There was no significant association observed between the compliance and non-compliance group (p=0.731) on the basis of gender.

From the above table it is evident that majority of the studied sample belonged to rural area 539 (89.8%) as compared to urban area 61(10.2%). Place of residence was significantly associated with non-compliance of the treatment as majority of non-compliant group 293 (48.8%) belonged to rural area.

Only 68 (11.3%) of the respondents in our study had migrated from other areas. There was statistically

significant association (p=0.003) observed in context to migration as most of the migrants 7 were non-compliant to the treatment.

Majority of the respondents 87.3% were Hindu whereas Muslims accounted for only 10.2% of the sample in the present study. No statistical association was observed (p=0.290) according to the religion of the respondents.

Out of 600 participants, 242 (40.3%) of the participants were illiterate. One hundred and twenty one participants (20.2%) studied up to primary school while 104 (17.3%) were educated up to middle school levels. Only 4(0.7%) studied up to graduation. Most of the non-compliant (140) were illiterate in studied sample, which was statistically significant.

It has been observed from the above table that majority of the respondents 339 (56.5%) were involved in unskilled work. Seventy (11.7%) of the participants were unemployed. Lower levels of occupational status was found to be statistically significantly associated with noncompliance status.

Table 1: Distribution of study population according to Socio demographic factors.

	Sacia damaguanhia factar	Compliance status		T-4-1 (0/)	Dyalua	
	Socio demographic factor	Yes (%)	No (%)	Total (%)	P value	
Age in years	<30 years	43 (7.2)	17 (2.8)	60 (10.0)		
	31-40 years	126 (21.0)	115 (19.2)	241 (40.2)		
	41-50 years	59 (9.8)	77 (12.8)	136 (22.7)	< 0.001	
	51-60 years	46 (7.7)	71 (11.8)	117 (19.5)		
	>60 years	26 (4.3)	20 (3.3)	46 (7.7)		
Candan	Male	201 (33.5)	197 (32.8)	398 (66.3)	0.731	
Gender	Female	201 (33.5)	197 (32.8)	398 (66.3)	OR-1.06	
Locality	Urban	54 (9.0)	7 (1.2)	61 (10.2)	< 0.001	
	Rural	246 (41.0)	293 (48.8)	539 (89.8)	OR-9.1	
History of	Yes	7 (1.2)	22 (3.7)	29 (11.3)	0.003	
migration	No	293 (48.8)	278 (46.3)	571 (95.2)	OR-3.31	
	Hindu	263 (43.8)	261 (43.5)	524 (87.3)	0.290	
Religion	Muslim	27 (4.5)	34 (5.7)	61 (10.2)		
	Other	10 (1.7)	5 (.8)	15 (2.5)		
	Illiterate	102 (17.0)	140 (23.3)	242 (40.3)		
	Primary school certificate	57 (9.5)	64 (10.7)	121 (20.2)		
	Middle school certificate	56 (9.3)	48 (8.0)	104 (17.3)		
<b>Education status</b>	High school certificate	41 (6.8)	22 (3.7)	63 (10.5)	0.001	
	Intermediate or post high school diploma	43 (7.2)	23 (3.8)	66 (11.0)	_	
	Graduate or post graduate	1 (.2)	3 (.5)	4 (.7)		
Occupation status	Unemployed	28 (4.7)	42 (7.0)	70 (11.7)		
	Unskilled	162 (27.0)	177 (29.5)	339 (56.5)		
	Semiskilled	31 (5.2)	39 (6.5)	70 (11.7)	0.001	
	Skilled	21 (3.5)	13 (2.2)	34 (5.7)		
	Clerk, shop owner, farmer	52 (8.7)	20 (3.3)	72 (12.0)		
	Semiprofessional	6 (1.0)	9 (1.5)	15 (2.5)		
Total		300	300	600		

Table 2: Distribution of study population according to socio demographic factors.

	Casia damagnankia fastan	Compliance status		T-4-1 (0/)	D 1
	Socio demographic factor	Yes (%)	No (%)	Total (%)	P value
Socio economic status	Upper middle	11 (1.8)	14 (2.3)	25(4.2%)	
	Lower middle	66 (11.0)	15 (2.5)	81(13.5%)	0.001
	Upper lower	121 (20.2)	131 (21.8)	252(42.0%)	
	Lower class	102 (17.0)	140 (23.3)	242(40.3%)	
Type of family	Joint	44 (7.3)	17 (2.8)	61(10.2%)	0.001
	Three generational family	91 (15.2)	58 (9.7)	149(24.8%)	
	Nuclear family	165 (27.5)	225 (37.5)	390(65.0%)	
Number of family members	≤4 members	87 (14.5)	160 (26.7)	247(41.2%)	0.001
	5-6 members	141 (23.5)	120 (20.0)	261(43.5%)	
	>6 members	72 (12.0)	20 (3.3)	92(15.3%)	
Marital status	Unmarried	26 (4.3)	15 (2.5)	41(6.8%)	0.17
	Married	266 (44.3)	274 (45.7)	540(90.0%)	
	Widowed	8 (1.3)	11 (1.8)	19(3.2%)	-
Total		300	300	600	

Table 3: Distribution of study population according to habits.

		Compliance st	Compliance status		P value
		Yes (%)	No (%)	Total (%)	r value
Smoking	Yes	181 (30.2)	147 (24.5)	328 (54.7)	0.007
	No	119 (19.8)	153 (25.5)	272 (45.3)	0.007
Alcoholism	Yes	214 (35.7)	162 (27.0)	376 (62.7)	0.001
	No	86 (14.3)	138 (23.0)	224 (37.3)	0.001
Family history	Yes	14 (2.3)	35 (5.8)	49 (8.2)	0.002
	No	286 (47.7)	265 (44.2)	551 (91.8)	0.003
Total		300	300	600	

Table 2 shows that most of the participants (42%) belonged to upper lower and 40.3% to lower socioeconomic status as per the modified Kuppuswamy's scale. Non-compliance was found to be significantly high among lower middle group of socio-economic status. Most of the respondents 390 (65%) belonged to nuclear families, 149 (24.8%) belonged to three generational families and (10.2%) belong to joint families. Noncompliance was found to be significantly high among participants belonging to nuclear families. 261 (43.5%) of the respondents were having 4-6 members followed by 247 (41.2%) having <4 members in the family. The mean household size was 4.87±1.675. Non-compliance was found to be significantly high among small families as compared to large families. Among the studied sample majority of the respondents 540 (90%) were married whereas 41 (6.8%) of the people were unmarried.

Table 3 shows that the tobacco use among respondent 272 (45.3%) of the respondent were addicted to any form of tobacco including beedi, cigarette smoking and chewing of the tobacco. Tobacco use was significantly associated (p=0.007) with the non-compliance status of the respondents. 224 (37.3%) of the respondents were alcoholic. Consumption of Alcohol was significantly associated with non-compliance status of respondents (p<0.001). 49 (8.2%) of the respondents reported family

history of tuberculosis which was statistically significant with the non-compliance among the respondents (p=0.003).

#### **DISCUSSION**

Most of the respondents belonged to the age group of 31-40 years followed by the age group of 41-50 years. Increasing age was statistically associated with defaulter status which was similar to the findings by Chatterjee et al and Osiyale et al who obtained peak levels of defaulting at ages 40-49 years. Ages above 40 years are associated with a multitude of associated health problems which manifest at time and also represent a decreased ability to cope which might in turn lead to difficulties in compliance with therapy and tolerability with regard to side effects.

Two thirds of the respondents were male and 1/3<sup>rd</sup> were female and there was no statistical significance among default status and gender. These findings are similar to Boyle et al who also obtained no significant association between default status and gender.<sup>13</sup>

Urban rural location was significant for default status and most patients belonged to a rural area. There were a higher number of respondents in rural areas among noncompliant patients than expected on a proportions test. Urban rural differences are also associated with differences in education, socio-economic status and lack of health awareness in demographic studies. These may be factors playing a role in default status of the respondents.

Five per cent of the respondents had undergone migration and this was statistically significant among patients who did not complete MDT. Migration can affect compliance due to the problems faced with assignment of a new DOTS provider, re-enlistment in a new centre which needs to be addressed programmatically even though the number of people migrating is small.

Eighty three per cent of the respondents belonged to the lower socio-economic status which is a composite of education, occupation and total family monthly income as per Kuppuswamy scale. Respondents in the lower socio-economic status tended to be defaulters and these findings are similar to a study by Muture et al. Low socio-economic state is associated with a lesser education, income, standards of living and these may be contributory factors to default state of the respondents.

#### Personal and familial characteristics

Significant association (p<0.001) was observed between the type of family and default status among the respondents and respondents belonging to nuclear type of family were likely to be noncompliant. Mean household size was  $4.87\pm1.675$  and a smaller family size was significant for non-compliance. These finding were similar to those of Muture et al. <sup>14</sup> This may be due to the lack of family support which is an important determinant of health seeking behavior in illnesses.

Among the studied sample most of the respondents (90%) were married whereas (6.8%) of the people were unmarried. No significant association was obtained across marital status and default status.

Forty five per cent of the respondents were users of tobacco and use of tobacco was associated with default status. Similar findings were obtained by Pinidiyapathirage et al. Smoking is a risk factor for tuberculosis and health education for prevention of recurrence of tuberculosis involves advice to stop smoking. Neglect of this advice represents an overall neglect of health status and likelihood towards noncompliance. Similar results were obtained for consumption of alcohol in the current study and in the study by Pinidiyapathirage et al. 15

Family history of tuberculosis was significant for default state. Eight per cent of the respondents had other family members afflicted with tuberculosis among which 6% belonged to defaulters. This represents a trend among family to follow similar modes of health seeking and an

avenue to collectively address this when dealing with concurrent cases of tuberculosis among the family.

#### CONCLUSION

A case control study was conducted in the six rural TUs of Karimnagar over a period of six months among 300 defaulters and 300 persons who completed treatment using a semi structured questionnaire through a face to face interview. The following associations were statistically significant. Increasing age with respondents above 40 years were likely to be non-compliant, living in a rural area, having migrated and belonging to low socioeconomic status were also significant factors. Living in a nuclear family was also significant due to the lack of familial support. Patients who were tobacco users and consumers of alcohol were likely to be non-compliant. Families with multiple members suffering from TB were likely to have non-compliant patients.

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