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Assessment of Epidemiological Determinants in Tuberculosis Patients Receiving DOTS under RNTCP

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ABSTRACT

Introduction: Tuberculosis is a barrier to socio-economic development as the greatest burden of tuberculosis incidence and mortality in India is in adult and socio-demographic factors, are a major determinant of ill- health and barrier to health care.

Methodology: Out of six Designated Microscopy Centres in Ujjain city (Madhya Pradesh), two DMCs were selected. 241 patients were included in the study from registered 253 patients.

Results: Mean age of subjects was 35.9 ± 13.8 years. Tuberculosis was more common in males, >3/4th participants had pulmonary tuberculosis. Nearly 1/5th of participants were illiterate (24.5%), <1/3rd participants were unemployed and less than half were unskilled workers. Majority (2/3rd) belonged to class IV according to Kuppuswamy's scale of socio economic status. 66.8% study participants were married. Nearly 2/3rd participants were from nuclear family & living in kuccha or semi-pucca houses. More than 3/4th participants were vegetarian and 44.4 % study participants were living in overcrowding. Tobacco consumption was prevalent in half of participants while alcoholism in < 1/4th subjects. One fifth participants had history of pre-existing illness and treatment.

Conclusion: Epidemiological characteristic like age, type of tuberculosis, literacy, occupation, economic status, marital status, type of family and living conditions like overcrowding, type of house have effect on development of tuberculosis.

Keywords: Tuberculosis, socio-demographic profile, epidemiological determinants, Ujjain city

INTRODUCTION

Tuberculosis bacilli was discovered by Robert Koch more than hundred years ago (24 march 1882) and the world is still fighting hard to control this deadly but easily curable disease.[1]Despite effective case finding and therapeutic tools, TB continues to be an important public health problem in India. The chronic nature of the disease, favourable agent, host and environmental factors, ability of the bacteria to remain dormant in the human body for years and socio-demographic factors are some of the factors which impede a rapid conquest of the disease. Situation is grimmer in India with highest burden (20 %) of disease and rank 1st worldwide.[2] It is estimated that about 40% of Indian population is infected with TB bacillus.[2] Tuberculosis is a barrier to socio-economic development as the greatest burden of tuberculosis incidence and mortality in India is in adult (15 and 54 years of age) who are the most productive members of society, so the resultant economic cost for the society is high.[3] The risk for developing TB disease is higher in persons with HIV, diabetes, other chronic debilitating disease leading to immune-compromise, poor living conditions, malnutrition, tobacco smokers, alcoholism, no previous BCG vaccination etc.[4]Out of these, the socio- demographic factors, undoubtedly, are a

major determinant of ill- health and barrier to health care. "Does socio demographic profile of the tuberculosis patient has any impact on this?". This part though very important has not been studied in great detail in central part of India and there is a paucity of information on this aspect of the disease.The present study**"Assessment of Epidemiological Determinants in Tuberculosis patients receiving DOTS under RNTCP"**conductedin urban area of Ujjain, to address these issues and to suggest measures for prevention of tuberculosis.

MATERIAL AND METHODS

This cross sectional study was conducted at selected DOTS centres located in Ujjain city (selection of DOTS centre was done by simple random sampling). For simple random sampling, serial numbers was given to all six DMCs from one to six at random and two DMCs were selected. These are Ujjain Charitable Trust Hospital (UCTH) and Civil Hospital Madhav Nagar (CHMN)

Ethical Consideration -The study was started after obtaining ethical approval from the Institutional Ethic Committee, R. D. Gardi Medical College, Ujjain, MP and from the Officer In-charge of District Tuberculosis Centre, Ujjain, MP. All the study subjects were explained in detail about the purpose and methodology of the study, potential risk and benefit. Procedure of maintaining confidentiality and right to not to participate in this study, was provided to them. Thereafter a written consent was obtained in consent form.

Study Population - The study population comprised of diagnosed cases of tuberculosis who received treatment under RNTCP at the selected DOTS centres of Ujjain during the study period.

Sample Size, Sampling Procedureand Period of Study- The study was conducted from 01 June to 31 September 2012. Out of 253 TB patients, who were registered in the DOTS centres at the time of study, 241 patients were included in the study as sample. Rest 12 tuberculosis patients opted to stay out of this study, were excluded. Data collection and data entry was done simultaneously. Data was analysed using appropriate statistical tests keeping in view the aim and objectives of the study.

Socio-economic Status: The study was conducted on urban population. So The Modified Kuppuswamy Scale was adopted by using conversion factor for 2011[5].

Inclusion and Exclusion criteria

In this study adult tuberculosis cases (pulmonary and extra-pulmonary) registered at the selected DOTS centres **(**Patients of all categories of tuberculosis) who consented to participate in the study were included.

Transfer out Patients cases were excluded from the study.

RESULTS

In present study 241 tuberculosis patients was considered as study participants.Out of 241 study participants 171 (71%) were from Civil Hospital Madhav Nagar (CHMN) and 70 (29%) were from Ujjain Charitable Trust Hospital (UCTH).

Majority of study participants (76.7%) were between15 to 45 years of age. Tuberculosis was reported more in age group of < 30 years followed by age group of 31 to 45 years which form economically productive age group. Tuberculosis patients of above 60 years represent only 3.7% of study participants. Male female ratio in present study was 1.7: 1. In present study, 59 (24.5%) study participants were illiterate and 182 (75.5%) were literate. Among the literate participants majority had completed middle school education (24.5%) followed by primary school education (23.7%). Representation of graduate and professional in study was only 2.1%. Among 241 study participants, 174 (72.2%) study participants were employed and 67 (27.8%) were without any job and those who were employed majority of participants working as unskilled worker (42.7%).**(Table 1)**

194 (80.5%) study participants were earning between Rs. 1413-7052per month. According to modified Kuppuswamy's scale of socio-economic status majority of study participants (67.6%) were belong to Upper Lower class. The upper two classes (Upper Class and Upper Middle) together account only 3.3% of study participants.**(Table 1)**

Majority of study participants were Hindu (82.6%) and married (66.8%). Most of the study participants were residing in nuclear family (62.7%), had kutcha house (36.1%) and preferred vegetarian (77.6%) food. 44.4% of study participants had less living space in comparison to total number of family members. **(Table 1)**

Out of 241 study participants 194 belongs to treatment category I. Among these new cases pulmonary sputum positive, pulmonary sputum negative and extra pulmonary cases were 101 (52.1 %), 44 (22.7 %), 49 (25.2 %) respectively. Rest 47 participants belong to treatment category II. Among these retreated cases relapse, failure and defaulter were 33(70.2%), 03(06.4%), 11 (23.4%) respectively. Ratio of Category I and Category II in present study was 4.3:1. Out of 241 participants 187 (77.6%) had pulmonary tuberculosis and 54 (22.4%) had extra pulmonary tuberculosis.

Table 1: Socio demographic characteristics of study participants

Socio demographic characteristics	Treatment category		Total (%) (n=241)	P value
	Category I (%)(n=194)	CategoryII (%) (n=47)		
Age				
15 - 30	96 (49.5)	20 (42.6)	116 (48.1)	0.2328
31 - 45	50 (25.8)	19 (40.4)	69 (28.6)	
46 - 60	39 (20.1)	08 (17.0)	47 (19.5)	
61 - 75	07 (3.6)	00 (00)	07 (2.9)	
>75	02 (1.0)	00 (00)	02 (0.8)	
Sex				
Male	124 (63.9)	29 (61.7)	153 (63.5)	0.7773
Female	70 (36.1)	18 (38.3)	88(36.5)	
Education				
Illiterate	47 (24.2)	12 (25.5)	59 (24.5)	0.551
Primary	47 (24.2)	10 (21.3)	57 (23.7)	
Middle school	45 (23.2)	14 (29.8)	59 (24.5)	
High School	29 (14.9)	09 (19.1)	38 (15.8)	
Intermediate	22 (11.3)	01 (2.1)	23 (9.5)	
Graduate	03 (1.5)	01 (2.1)	04 (1.7)	
Professional	01 (0.5)	00 (00)	01 (0.4)	
Occupation				
Unemployed	53 (27.3)	14 (29.8)	67 (27.8)	0.9458
Unskilled worker	83 (42.8)	20 (42.6)	103 (42.7)	
Semi skilled	15 (7.7)	04 (8.5)	19 (7.9)	
Skilled worker	04 (2.1)	02 (4.3)	06 (2.5)	
Clerical/shop/farm	37 (19.1)	07 (14.9)	44 (18.3)	
Semi professional	01 (0.5)	00 (00)	01(0.4)	
Professional	01 (0.5)	00 (00)	01 (0.4)	
Income				
<1412	07 (3.6)	00 (00)	07 (2.9)	0.8039
1413-4232	101 (52.1)	26 (55.3)	127 (52.7)	
4233-7052	52 (26.8)	15 (31.9)	67 (27.8)	
7053-10554	24 (12.4)	05 (31.9)	29 (12.0)	
10555-14106	09 (4.6)	01 (2.1)	10 (4.1)	
14107-28214	01 (0.5)	00 (00)	01 (0.4)	
>28215	00 (00)	00 (00)	00 (00)	
Socio-economic status				
I (Upper Class)	01 (0.5)	00 (00)	01 (0.4)	0.1107
II (Upper Middle)	07 (3.6)	00 (00)	07 (2.9)	
III (Lower Middle)	55 (28.4)	08 (17.0)	63 (26.1)	
IV (Upper Lower)	124 (63.9)	39 (83.0)	163 (67.6)	
V (Lower)	07 (3.6)	00 (00)	07 (2.9)	
Religion				
Hindu	163 (84.0)	36 (76.6)	199 (82.6)	0.4401
Muslim	20 (10.3)	08 (17.0)	28 (11.6)	
Sikh	07 (3.6)	01 (2.1)	08 (3.3)	
Christian	04 (2.1)	02 (4.3)	06 (2.5)	
Marital status				
Married	124 (63.9)	37 (78.7)	161 (66.8)	0.1731
Unmarried	53 (27.3)	08 (17.0)	61 (25.3)	
Divorced	02 (1.0)	01 (2.1)	03 (1.2)	
Widowed	15 (7.7)	01 (2.1)	16 (6.6)	
Type of family				
Nuclear	121 (62.4)	30 (63.8)	151 (62.7)	0.2272
Joint	39 (20.1)	13 (27.7)	52 (21.6)	
3 generation	34 (17.5)	04 (8.5)	38 (15.8)	
Dietary habit				
Vegetarian	153 (78.9)	34 (72.3)	187 (77.6)	0.3357
Non-vegetarian	41 (21.1)	13 (27.7)	54 (22.4)	
Type of house				
Kutcha	72 (37.1)	15 (31.9)	87 (36.1)	0.7154
Semi- pucca	59 (30.4)	14 (29.8)	73 (30.3)	
Pucca	63 (32.5)	18 (38.3)	81 (33.6)	
Overcrowding				
Present	85 (43.8)	22 (46.8)	107 (44.4)	0.7113
Absent	109 (56.2)	25 (53.2)	134 (55.6)	

Among 187 pulmonary tuberculosis cases, 143 (76.5%) were sputum positive and 44 (23.5%) were sputum negative cases. Ratio of pulmonary to extra pulmonary tuberculosis cases was 3.5 : 1.

58 (24.1%) study participants had history of contact with active case of tuberculosis either at residential area or at work place. 66 (27.4%) study participants had past history of tuberculosis in family. Out of these, 33 (13.7%) themselves had suffered from tuberculosis in past. Tobacco consumption was prevalent in 108 (44.8%) study participants in any form. Out of these 108 participants most of participants (20.7%) had habit of smoking as well as chewing tobacco while rest of participants either smoke (17.0%) or chew tobacco (7.1%). However 55.2% study participants did not consume tobacco. Alcohol consumption was prevalent in 52 (21.6%) study participants. However 189 (78.4%) study participants did not consume alcohol. Overcrowding in household was found in 107 (44.4%) participants.

Study participants present with different clinical features at Doctor as tuberculosis has different sign and symptoms in different patients. Cough (60.6%) was most common symptom among study participants, followed by fever (53.9%), weakness (47.3%), weight loss (35.7%) etc. Other symptoms include swelling, abdominal pain, nausea, vomiting, vertigo etc. 20.3% participants had pre-existing illness. Among them 6.2% participants had diabetes, 5.4% had COPD, 3.3% had bronchial asthma and 2.9% had hypertension. 79.7% participants had no pre-existing illness.

DISCUSSION

In present study, age wise distribution of 241 study participants reveals that majority (76.7%) of tuberculosis patients were in younger and economically productive group of 15 to 45 years. Out of these, maximum numbers of study participant (48.1%) were of 15 to 30 years age group. Mean age of study participants was 35.9 ± 13.8 years, for male 38.4±13.4 years and for female 31.5±12.1 years. Similar percentage was found in a study carried at DOTS center of Karnataka, by Chennaveerappa PK et al[6]. High percentage of study participant, belong to reproductive age group, was shown by N. Pandit et al[7](85%).

In present study reveals that 59 (24.5%) participants were illiterate and 182 (75.5%) were literate. Study by S.K.Sahuet al[9] in all district of Orissa showed that median literacy rate of TB patients was 63.4%. Higher percentage of illiteracy was found in the study by Krishnadas Bhattacharyya et al[10] (30.8%), Moharana PR et al[11] (35%) and SL Chadha et al[12] (39%).

Occupation wise distribution of 241 study participants in present study, reveals that 174 (72.2%) participants were employed and 67 (27.8%) was unemployed. Majority of study participants were unskilled worker (42.7%) and shop owner (18.3%) followed by semi-skilled (7.9%), skilled worked (2.5%). Study by A. Mishraet al[13] in six DOTS centres of Gwalior Showed that out of 312 tuberculosis patients, 15.1% were students, 38.8% were unemployed, 14.1% were unskilled and 18.3% were skilled workers.

In present study, socio-economic status wise distribution of 241 study participants reveals that 170 (70.5%) study participants belonged to lower and 71 (29.5%) belonged to middle and upper socio-economic status. Majority (67.6%) of participants were in class IV according to modified Kuppuswamy's scale. Similar finding was found in study of Moharana P R et al[11]. In this study participants in low, medium and high socio-economic status was 70%, 27% and 04%. Study by M. Muniyandiet al[14] in Velliyur TB unit of Tiruvallur district of Tamilnadu showed that out of 455 patients, 62% of the patients belonged to below poverty line. Association between demographic variables with category of tuberculosis not found statistically significant.

In present study, history of contact with tuberculosis casesreveals that 24.1% participants were in contact with active case of tuberculosis and 27.4% had past history of tuberculosis in family. Study by Khalid Umer Khayyamet al[15] in LRS institute, New Delhi showed that 6% participants had family history of tuberculosis and 2% of population had past history of tuberculosis.

In present study, tobacco consumption was prevalent in 108 (44.8%) study participants. 17% participants were use tobacco in smoke form, 7.1% in smokeless form and 20.7% in both form. Higher percentage (58.7%) of tobacco consumption was found in study of Moharana PR et al[11] while lower percentage (36%) of tobacco consumption was found in a study carried out in Tiruvallur District of Tamil Nadu by T Santhaet al.[16] Alcohol consumption was prevalent in 52 (21.6%) study participants. Similar percentage of alcohol consumption (20%) was found in study of Subodh K et al[17].

It is widely known that with increase in Socio economic status chances of acquiring TB decreases and chances of recovery increases, here also as the status improved there was a increase in the cure rate. Treatment success was higher among participants belong to upper socio economic class (94.4%) than participants of lower socio economic (84.1%). Thus treatment outcome was significantly influence by socio economic status of study participants.

CONCLUSION

Study subjects range from 18 to 80 years with mean age of 35.9 ± 13.8 years. Tuberculosis was more common in males (63.9%), nearly one fifth of study participants were illiterate (24.5%), less than 1/3rdstudy participants were unemployed and less than half were unskilled workers. Family income of 2/5th study participants were in between Rs.1413/- to 7052/- per month. Majority (2/3rd) of study participants were in class IV according to Kuppuswamy's scale of socio economic status. 66.8% study participants were married. Nearly 2/3rd participants were from nuclear family and living in kuccha or semi-pucca houses. More than 3/4th participants were vegetarian and 44.4 % study participants were living in overcrowding. Tobacco consumption was prevalent in halfof participants while alcoholism in < 1/4th subjects. One fifth participants had history of pre-existing illness and treatment. More than three fourth had pulmonary tuberculosis. Treatment success in form of cured and treatment completed was 87.1%.

RECOMMENDATION

Targeting the modifiable socio–demographic variables should be taken to reduce spread of tuberculosis in community.

Increase social welfare measures to improve the economic condition of patients. Efforts should be taken to create more job opportunities, so as to improve the overall socio-economic status of the individual and the community. As in western countries, tuberculosis infection had declined with improvement in living standard.

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