A profile study of tuberculosis patients in Gwalior, Madhya Pradesh

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Abstract

Background: Substantial progress has been made in reducing tuberculosis incidence over the past two decades. However, Tuberculosis (TB) continues to be one of the most devastating and widespread infections in the world, if left untreated, each person with active TB disease will infect on an average between 10 and 15 people every year. So to understand these factors study was carried out about socio-demographic profile of patients attending DOTS center.

Methodology: The study was conducted in 3 Tuberculosis units of Gwalior city from July 2016 to Oct 2016. Patients diagnosed as having TB and registered under RNTCP were included in the study. Total patients 550 were included in the study.

Results: Most of the patients coming to the RNTCP centers belong to the under-privileged group in the age group of 16 to 30 years, (40.2%), male to female ratio was observed to be 1:0.5. Majority of the patients lived in nuclear families (68.3%), belonged to low socio-economic status (77.2%) and dwelled in overcrowded houses (71.6%). 6.9% reported history of contact with tuberculosis patients. More than half of the patients (58.5%) were undernourished. In the study, 55.5% had pulmonary TB and 44.5% had extra-pulmonary TB. HIV co-infection was prevailing in 15 patients and smoking and alcohol intake was present in 72.5% and 2% respectively and it was found statistically significant.($P<0.05$).

Conclusion: An improvement in living conditions, education, socioeconomic status and sanitation is desirable to curtail down the prevalence of tuberculosis.

Keywords: Tuberculosis prevalence, Socio-demographic profile, Clinical status, Running Title: Tuberculosis patients profile study

Introduction

Despite the early discovery of the causative agents and the anti-tuberculosis therapy, Tuberculosis yet remains one of the deadliest communicable diseases worldwide. According to the Global Tuberculosis report 2014, an estimated 9 million people developed Tuberculosis & approximately 1.5 million people died of tuberculosis in the year 2013.(1) In the recent 20th edition of the Global TB report 2015, it is stated that the year 2015 is a milestone year in the history of tuberculosis. As the year ends, it marks the expiry of Millinium Development Goals (MDGs) and the transition into the new era of sustainable development goals (SDGs). It also marks the transition from stop TB strategy to end TB strategy. From the year 2016, it is aimed to implement end TB strategy which focuses on reducing TB related deaths by 90% by 2030 (as compared to 2015 levels), reducing new cases by 80% & ensuring that no family should be burdened with catastrophic costs related to TB.(2) To ensure control of tuberculosis as a public health problem, efforts are to be made at every level. People at risk for developing tuberculosis should be screened regularly for the development of the disease. The delay in diagnosis and initiation of appropriate treatment may often be long, which can result in untoward complications including death.

Besides all the efforts, tuberculosis (TB) yet remains one of the major public health concerns in the world especially WHO South East Asian Region (SEAR) which accounts for 39% of the global TB incidence. It is estimated that about 3.4 million new cases of TB continue to occur each year and that about 4, 50,000 people died of TB in 2012, most of these in five countries namely Bangladesh, India, Indonesia, Myanmar and Thailand. India ranks first among the high TB burden countries and contributed about 26% of estimated global incident TB cases in the year 2012.(3)

Studies of TB are scantily available both in global and national contexts. Reliable data on the burden of all forms of TB in India are required recurrently. Hence, a study of TB cases was carried out to determine the socio-demographic profile, type of TB in the TB units of Gwalior city, knowing that the socio-demographic profile can help in understanding the groups that are vulnerable to the disease and treatment outcomes will help us to know whether RNTCP regimen is effective in TB.

Methodology

A cross sectional study was conducted amongst the patients suffering from tuberculosis who were registered under DOTs in Gwalior district during duration of study July 2016 to Nov 2016. All patients diagnosed as TB and registered under RNTCP were included in the study. 3TB units from the six TB units of Gwalior city were selected by simple random sampling. The study tool designed comprised of 3 sections – socio-demographic details; relevant medical & personal history & clinical profile of the patients. A total patient 550 was enrolled after their full consent and 18 patients were discarded due to not providing

support. Data collection was started after obtaining the institutional ethical committee clearance and permission from respective authorities 0f district health centre. All registered cases of tuberculosis (sputum positive, sputum negative, pulmonary or extra pulmonary) who gave an informed consent to participate were included in the study. The past history of tuberculosis, diabetes in patients, their HIV seropositivity status, or other personal lifestyle habits had no bearing on the inclusion/exclusion of the subjects in the study. The data regarding socio-demographic profile, history of contact with TB patients, etc. was collected by a pre-tested questionnaire during their visit to the hospital/ health centre and the patients were examined to assess the response to treatment and outcome of treatment. The data was analyzed using epi-info version 3.4.1. Descriptive statistics (means, proportions, percentages), chi square test and relative risk ratio (Adjusted Odds ratio) was used.

Results

Table 1 shows the age distribution of the patients, most (40.2%) belonging to 16-30 year group. The mean age of the patients in our study was 34.7(16.5) years with 95% CI of 33.3-36.1. Out of 550 study subjects tuberculosis was found to be maximum in males i.e. 65.3%, as compared to females i.e. 34.7% with OR was 3.7 and the association was statistically insignificant(p=0.001). Majority of study subjects were Hindu by religion with urban area and tuberculosis was also maximum among Hindus and urban areas i.e. 89.3%, 57.3 % (p=0.001) respectively. Tuberculosis results were maximum among illiterate i.e. (31.3%), followed by upto middle 30.7%. A statistically significant difference (P=0.001) was found between literacy status. Tuberculosis had shown increasing trend with decrease of per capita income i.e. tuberculosis were maximum amongst subject of very poor socio-economic status group (class V) (39.6) followed with class IV (37.8%) and significant statistical association (p=0.001) was found between the socio-economic status and the tuberculosis prevalence. Out of total 550 study subjects maximum were unskilled worker by occupation i.e.51.6% with OR 11.4(95% CI-8.5;15.3) and minimum (3.1%,) were in semi-professional/professional jobs and this was also found statistical significant difference(p=0.001). It was observed that environmental factors i.e., kutcha house, presence of overcrowding, absence of cross ventilation, positive smoking history and having smoke producing cooking medium have more tuberculosis cases compared to their counterparts which was 36.5%, OR=3.0[95% CI;2.3,3.8], 71.6%, OR=6.4[95% CI;4.9,8.3], 57.5%, OR=1.8[95% CI 1.4;2.3], 72.5, OR6.9 [95% CI;5.3'9.1] and 59.6%, OR=2.1[95% CI;1.7,2.8) respectively and all were found significant statistically (P=0.001).

Table 1: Socio-Demographic Characteristics of study subjects (n=550)

Socio-Demographic Variables		TB patient No.(%)	Odds ratio	P value
Age groups	0-15	50(9.1)	Reference	0.001
	16-30	221(40.2)	6.71(4.8;9.4)	
	31-45	147(26.7)	5.0(3.9;6.3)	
	46-60	89(16.2)	3.8(3.1;4.6)	
	>60	43(7.8)	2.9(2.4;3.5)	
Gender	Male	359(65.3)	3.7(2.8;4.7)	0.001
	Female	191(34.7)	reference	
Place of residence	Rural	235(42.7)	0.5(0.4;0.7)	0.001
	Urban	315(57.3)	reference	
Religion	Hindu	491(89.3)	NA	NA
	Muslim	55(10.0)		
	Others	4(0.7)		
Educational status	Illiterate	172(31.3)	3.4(2.8;4.2)	0.001
	Upto middle	169(30.7)	2.9(2.3;3.8)	
	Upto intermediate	79(14.4)	1.7(1.2;2.5)	
	Graduate/post graduate	49(8.9)	Reference	
Occupations	Unemployed	92(16.7)	10(7.7;12.9)	0.001
	Unskilled worker	284(51.6)	11.4(8.5;15.3)	
	Skilled worker	89(16.2)	5.2(3.5;7.6)	
	Clerical/Farmer/Shop owner	68(12.4)	4.4(2.6;7.6)	
	Semi-professional/Professional	17(3.1)	Reference	
Socio – Economic status	I	16(2.9)	Reference	0.001
	II	22(4.0)	1.4(0.7;2.7)	

	III	86(15.6)	3.6(2.4;5.4)	
	IV	208(37.8)	7.9(5.8;10.7)	
	V	218(39.6)	10.7(8.2;13.9)	
Type of house	Pucca	349(63.4)	Reference	0.001
	Kutcha	201(36.5)	3.0(2.3;3.8)	
Overcrowding	Yes	394(71.6)	6.4(4.9;8.3)	0.001
	No	156(28.4)	Reference	
Cross Ventilation	Yes	234(42.5)	Reference	0.001
	No	316(57.5)	1.8(1.4:2.3)	
Smoking history	Yes	399(72,5)	6.9(5.3:9.1)	0.001
	No	151(27.5)	Reference	
Type of cooking medium used	Smokeless	222(40.4)	Reference	0.001
	Smoke producing	328(59.6)	2.1(1.7;2.8)	
Alcohol used	Yes	121(22%)		
	No	429(78%)		
NA - Not applicable: selected RNTCP center of Gwalior city are Hindu majority area				

Table 2: Tuberculosis patients proportion according to Clinical Characteristics

Clinical variables		No(%)	Odds ratio	P value
Sputum analysis	Positive	177(32.2)	NA	NA
	Negative	373(67.8)		
BMI Group (kg/m^2)	<18.5	322(58.5)	2.2(1.8;2.9)	0.001
	18.5 – 24.9	212(38.5)	Reference	
	25-30	15(2.7)	0.7(0.6;0.8)	
	>30	1(0.2)	0.4(0.3;0.5)	
Glycemic status	Diabetic	85(15.4)	29.9(21.6;41.5)	0.001
	Normoglycemia	465(84.6)	Reference	
Category of TB	Category – I	445(80.9)	17.9(13.3;24.3)	0.001
	Category – II	105(9.1)	Reference	
Site of TB	Extra-Pulmonary	245(44.5)	Reference	0.003
	Pulmonary	305(55.5)	1.55(1.22;1.96)	
Duration of ATT initiation	Started within 1 week	405(73.6)	8.8(6.9;11.1)	0.001
	Within or completed IP	87(15.8)	1.59(1.1;2.3)	
	Within or completed CP	58(10.5)	Reference	
Past ATT history in Category II (n=105)	Completed	62(59.0)	Reference	0.008
	Incomplete	43(41.0)	0.5(0.3;0.8)	
Reasons for incomplete ATT(n=43)	Side-effects	4(9.3)	Reference	0.001
	Change in place of residence	11(25.6)	2.8(0.9;8.8)	
	Incompatibility with DOTS provider	3(6.9)	1.7(0.7;4.2)	
	Unknown/non specific	25(58.1)	3.3(1.7;6.3)	
History of contacts with TB patients	Yes	38(6.9)	NA	0.001
	No	512(93.1)		
Recent weight loss(5 kg or more)	Yes	363(66.0)	3.8(2.9;4.8)	0.001
	No	187(34.0)	Reference	
HIV Status	Positive	15(2.7)	NA	NA
	Negative	535(97.3)		
NA: Not applicable because population percentage data was not available				

The prevalence of TB across some clinical characteristics within the study subjects is shown in Table 2. Overall Sputum positivity was 32.3% i.e. 177 cases were sputum positive out of 550 study subjects.

Sputum positivity was found maximum in age group 31-45 years. More than half of the patients (58.5%) were undernourished means had BMI <18.5 with significant statistical association (p=0.001, OR=2.2[95%CI; 1.8, 2.9). 6.9 per cent of the patients gave a history of contact with TB patients and it was observed to be significantly associated with the type of TB. Among the patients identified 55.5% had pulmonary TB (OR=1.5, 95%CI; 1.2, 1.9 [P=0.003] and 80.9% had category I (P=0.001, OR=17.9, 95% CI; 13.3, 24.3). With the history of their treatment majority of patients (73.6%) was included who has been started their ATT treatment within 1 week and 59% had been completed their past ATT treatment in category II. Most prominent reasons for incomplete ATT was unknown/non specific (58.1%, OR=3.3) followed with change in place of residence (25.6%, OR=2.8) and this was found statistically significant (p=0.001). The most common co-morbidities associated with TB were recent weight loss (66%), alcohol use (22%), diabetes 15.4%), and AIDS (2.7%).

Discussion

In present study maximum subjects were reported in the age group of 16-30 year i.e. 40.2.5% while least was in age group above 60 years (7.8%), that was comparable to study conducted by S Gupta et al[4] observed that maximum cases (41.5%) were in age group 21-40 years followed by 38.2% in 41-60 years and 11.6% in age group of >60 years. Contrary to these studies Q H Khan[5] reported maximum prevalence rate (63.83/1000) in age group 60 years and more 6. Raviglione et al had also reported maximum cases in >65 years of age.[6]

Present study reveals that maximum study subjects were male i.e.65.3% as compared to 34.7% female. Similar male dominance for pulmonary tuberculosis was found in studies conducted by Aarti Kaulagekar and Anjali Radkar[7] (57.8% males v/s 42.2% females)8, Phalke Baburao et al,[8] Itah and Udofia[9] and Q H Khan.[5] In our study sputum positivity was observed (32.2%) and it was similar to observation by Sumit Jethani et al.[10] who had 40%. Tuberculosis was found maximum in illiterate and little literate persons. Low education levels imply low professional qualifications, which might restrict access to both the labor market and healthcare services. Moreover, low education levels may be strongly associated with TB deaths due to the failure of individuals to perceive or understand the state of their disease.[11] In this study tuberculosis were maximum among lower socio economic status (Class V) i.e. 39.6%, followed by 37, 8% in class IV subjects which was similar to Aarti Kaulagekar and Anjali Radkar in their study "Social status makes a difference.[12] Tuberculosis scenario reported a descending order of prevalence among lower socio economic status to upper class status different casts. The higher tuberculosis in lower class in present study could be due to living conditions, ignorance and lack of health advice seeking behavior among this class.

Alcohol use (22%) was the most frequent co-morbidity reported in the present study as similar to study of Juliano Souza Caliari[13] who reported 25%. Alcohol use and other forms of chemical dependency hinder treatment compliance due to the lifestyles adopted by the affected individuals. The prevalence of under nutrition (BMI <18.5) observed by us is similar 58.5% with Sushma bhai S *et al*,[14] they had a prevalence of 42%. The proportion of extra-pulmonary cases (44.5%) observed by us is similar to that observed in a retrospective analysis of TB cases carried out at the LRS institute of TB and Respiratory Diseases, New Delhi[15] which reported that 47% of the cases were extra-pulmonary TB. 80.9% of the patients were put on Category I, followed by 9.1% on Category II in the present study while in Kabra *et al*'s[16] study of the total 459 patients,70.3% patients were in Category I, 2.6% were in Category II and 26.1% in Category III.[14] This difference may be explained by the fact that their study was hospital-based. However, Category III has been merged into Category I or called as the new case regimen now.

In our study weight loss was present in quiet a high number of subjects (66.0%) similar to Sumit Jethani et al.[17] who had 84% but contrary to 30.32% reported by Jha et al.[18] We observed an overall treatment completion rate was 59% but it was contrary to Sharma S *et al* in their study was 94.9%. This difference may be explained by the fact that our study includes most of the new cases and not followed to them up to treatment completion. Our observation of history of contact with TB patients is contrary to the findings observed by Madhi F et al[19] in a Paris suburb, where 22% had history of contact with TB patients. Prevalence of HIV infection in the patients was 2.7%. Several studies have shown a prevalence between 0.8 to 2%.[20,21,22]

Conclusion

With the current demographic transition and increasing life expectancy in low- and middle-income countries, the proportion of young person's is increasing, and the incidence of TB among them is expected to increase. Thus, failure of early identification and management of TB in the youth can present major challenges for a TB control programme– perpetuating the chain of transmission in the community.[23]

This study has observed that TB still continues to be a major problem in younger age group fifteen to thirty years of age who are undernourished and belonging to low socio-economic status. Poor housing conditions which continue to haunt our population is an important risk factor for TB transmission. Thus improving the socio-economic conditions and proper treatment of adult TB who are the major source of infection to youth will go a long way in preventing

adult TB and protect youth who are the pillar of our country. The RNTCP DOTS strategy is an effective treatment modality for TB in adults achieving a high treatment completion rate (94.7%), and low death rate (0.5%).

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