

Association of Alcohol intake with Pulmonary Tuberculosis: A Case Control Study

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Abstract

Background: India is the highest TB burden country in the world and accounts for nearly one fifth (20%) of global burden of TB. Every year approximately 1.80 million persons develop TB of which 0.82 million are infectious. Along with well-established risk factors such as human immunodeficiency virus (HIV), malnutrition, emerging variables such as diabetes, indoor air pollution, alcohol, use of immunosuppressive drugs, and tobacco smoke play a significant role at both the individual and population level.

Objectives: To study the association of pulmonary tuberculosis among the alcohol users.

Methodology: A community based Case-Control study was conducted in an area covered by all the ten (10) designated microscopy centers under West Tripura District. A total of 90 cat I pulmonary tuberculosis patients and 270 neighbourhood controls matched for age and sex were interviewed according to a predesigned interview schedule.

Result: It has been observed that, the participants who consume alcohol had 3.2 times higher risk of developing Pulmonary Tuberculosis and this association was statistically significant [3.269 (P<0.0001)]. Conclusion: Alcohol consumption is associate with higher risk of Tuberculosis.

Keywords: Pulmonary Tuberculosis; Alcohol Consumption; Misclassification Error

Introduction

Tuberculosis, commonly known as TB, is an infectious disease caused by various strains of Mycobacteria, especially Mycobacterium tuberculosis. TB most commonly affects the lung. It can spread through the lymph nodes and blood stream to any organ in the body [1]. The risk factors for TB consists of epidemiological triad of agent, host and environment. The agent being the tubercle bacilli, a susceptible person as a host and an environment, which allows the bacilli to survive and transfer from one host to another. Alcohol consumption act as a risk factor by increasing the susceptibility of human host. India has the highest TB burden country in the world and accounts for nearly one fifth (20%) of global burden

of TB. An estimated 35.6% people in Naxal-hit Chhattisgarh were found to be consuming alcohol, 34.7% in Tripura, 28.5% in Punjab, 28% in Arunachal Pradesh and 26.4% in Goa.

“States with high prevalence - more than 10% of alcohol use disorders - are Tripura, Andhra Pradesh, Punjab, Chhattisgarh and Arunachal Pradesh”, the report noted [2].

So far no studies have been found in Tripura to assess the association between alcohol consumption and pulmonary tuberculosis. Hence the present study is planned to assess the association between alcohol consumption and pulmonary tuberculosis in West Tripura District.

Materials and Method

The Study is community based case control study conducted at West Tripura district. The present study is a part of larger study namely "Association of Tobacco smoking and pulmonary Tuberculosis in West District of Tripura: a Case Control Study". Study population was cases of Pulmonary Tuberculosis patients who were ≥ 18 years of age diagnosed either bacteriologically or clinically as Pulmonary Tuberculosis, registered as Category I Pulmonary Tuberculosis. The state has eight districts, out of which the West Tripura District is the most populous district of the state. In Tripura, RNTCP has been operational in all the districts since 2005. Currently, the state has 10 tuberculosis unit and 52 designated microscopic centers and the West Tripura district has one tuberculosis unit and 10 designated microscopic centers and 131 DOTS centers. A list of the entire Category I pulmonary tuberculosis patients of age ≥18 years, registered under each DOTS center and DMCs were prepared after collecting the names from all the DMCs separately. This list was verified with the list available in District Tuberculosis Office of West District of Tripura. A sampling frame was prepared for the registered Category I pulmonary tuberculosis patients of ≥18 years in the DOTS centers under all the DMC in West Tripura District within the period of November' 2014 up to April' 2015 initiated of treatment with DOTS therapy under RNTCP. There were total 241 Category I pulmonary tuberculosis patients registered under RNTCP in West District of Tripura. A sample size of 90 cases and 270 controls were calculated [3]. However, this sample size was adequate considering the proportion of Alcohol users p₁ 72.4% among Tuberculosis patients and non alcohol users 44.7% [4], at 80% power and 5% level of significance for 1:3 case to control ratio. Category I pulmonary tuberculosis patients were chosen, as per inclusion criteria, by simple random sampling using random number table.

From this list 90 (ninety) randomly selected PTB patients were the cases in the present study and were interviewed at their home. Controls were selected simultaneously with the cases. Controls were healthy individuals in the community without the disease and also without any history of tuberculosis in the past from where the specific case was selected. During the selection of controls matching was done individually by age (+/- 2years), sex and place of residence (neighbourhood control) with the cases. All the controls were interviewed in the same way as the cases were interviewed. Data analysis was done manually as well as in SPSS version 25 and EPI info version 7.0. Data were expressed in frequency, percentage and statistical analysis was performed using Pearson's chi square test and Odds ratio was calculated by multiple logistic regression analysis. P value of < 0.05 was considered as statistically significant. The original study protocol was approved by the institutional ethics committee of Agartala Government Medical College.

Table 1 showed that mean age of the cases were (45.79 + 16.19) years and this was similar to the mean age of controls (45.88 + 16.14). Median age for case 45.50 IQR (31.75 – 56.25) & for control 45.50 IQR (32.75 – 56.25). According to the age groups, majority (53.89%) of the study participants were in the age group of 40-60 years for both cases (54.40%) and controls (53.70%). Majority of the participants (60.00%) among cases and majority of the participants (58.50%) among controls were married. Only 10.00% of the participants among cases had secondary and above education whereas 28.10% of the participants among controls had secondary and above education. Majority of the participants (37.80%) among cases were unskilled labour.

Variables		Cases N(%)	Controls N(%)
Age (mean ± SD)		45.79 ± 16.19	45.88 ± 16.14
Age groups	< 40yrs	32(35.60)	89(33.00)
	40 – 60yrs	49(54.40)	145(53.70)
	>60 years	9(10.00)	36(13.30)
Sex	Male	70(77.80)	210(77.80)
	Female	49(22.20)	60(22.20)
Caste/Community	General	26(28.90)	81(33.00)
	ST	11(12.20)	36(53.70)
	SC	30(33.30)	76(13.30)
	OBC	23(25.60)	77(28.50)
Marital Status	Married	54(60.00)	158(58.50)
	Single	36(40.00)	112(41.50)
Education status	Illiterate	28(31.10)	51(18.90)
	Primary	53(58.90)	143(53.00)
	Secondary and above	9(10.00)	76(28.10)
Occupation	Employee	5(5.60)	54(20.00)
	Skilled Labour	9(10.00)	16(5.90)
	Unskilled labour	34(37.80)	59(21.90)
	Business	9(10.00)	48(17.80)
	Unemployed	19(21.10)	70(25.90)
Type of family	Nuclear	51(56.70)	182(67.40)
	Joint	39(43.30)	88(32.60)
Per capita income	< 3000rs	59(65.60)	73(27.00)
	3000 – 6000rs	26(28.90)	123(45.60)
	>6000rs	5(5.60)	74(27.40)

Table 1: Socio –demographic profile of the study participants.

Distribution of the study participants according to habit of consuming alcohol

Habit of consuming alcohol	Case; N (%)	Control; N (%)
Yes	35(38.90)	44(16.30)
No	55 (61.10)	226(83.70)

Table 2: Showing the distribution of the study participants according to habit of consuming alcohol.

The study showed that only 16.30% of the participants among controls used to consume alcohol whereas 38.90% of the participants among cases used to consume alcohol. Majority of the participants (61.10%) among cases and majority of the participants (83.70%) among controls had no habit of consuming alcohol. The consumption of Alcohol by the cases is consistent with consumption pattern of Tripura [1].

Association of pulmonary tuberculosis with consumption of alcohol

Alcohol consumption		Case N (%)	Control N (%)	Significance
Habit of Alcohol consumption	Yes	35(38.90)	44(16.30)	X ² =20.114; df =1 P = <0.0001
	No	55 (61.10)	226(83.70)	

Table 3: Association of pulmonary tuberculosis with consumption of alcohol.

Statistical analyses revealed significant association between consumption of alcohol and development of Pulmonary Tuberculosis (P < 0.0001).

Alcohol consumption		Odds ratio(OR)	95% Confidence interval for OR	P value
Habit of Alcohol consumption	Yes	3.269	1.918 - 5.569	P<0.0001
	No	1		

Table 4: Multivariable logistic regression model to assess the association of alcohol intake with pulmonary tuberculosis.

Multivariable logistic regression analyses revealed that participants who consume alcohol had 3.2 times higher risk of developing pulmonary tuberculosis and this association was statistically significant [OR= 3.269 (P<0.0001)]. Similar study also reported

[5] alcohol intake was also found to have an association with the occurrence of pulmonary tuberculosis [adjusted OR = 1.7 (95% CI, 0.9 to 3.3)]. Sinaga Byon., et al. also reported OR of Tuberculosis for the alcohol consumption 1.83 CI (0.11-28.95), and for smoking and alcohol consumption group 13.7 (95% CI:4.02-46.94) [6].

Discussion

The present study revealed that 38.90% of cases of Tuberculosis are Alcoholic. Statistical analyses revealed significant association between consumption of alcohol and development of Pulmonary Tuberculosis (P <0.0001). Multivariable logistic regression analyses revealed that participants who consume alcohol had 3.2 times higher risk of developing pulmonary tuberculosis and this association was statistically significant [OR= 3.269 (P<0.0001)]. Similar finding was also obtained from another study [5] where alcohol intake was also found to have an association with the occurrence of pulmonary tuberculosis [adjusted OR = 1.7 (95% CI, 0.9 to 3.3)]. Again the results of an investigation showed that moderate/heavy drinkers (OR = 3.46; 95% CI = 1.56–7.69) were statistically associated with pulmonary tuberculosis for the study participants in multivariable logistic regression models [7]. The risk of contact Tuberculosis among alcoholic was 8 times higher than non alcoholic (OR 8.23 95% CI 2.71-24.98). The increased risk of active TB among alcoholics can be explained by both increased risk of infection related to specific social mixing patterns associated with alcohol use, as well as influence of alcohol on the immune system and alcohol related conditions [8]. Imtiaz S., et al. also reported in Alcohol consumption as a risk factor for tuberculosis: meta-analyses and burden of disease, RRs for alcohol use and alcohol-related problems were 1.35 (95% CI 1.09-1.68) and 3.33(95% CI 2.14-5.19) respectively [9].

Conclusion

From the present study, it has been observed that, the participants who consume alcohol had higher risk of developing Pulmonary Tuberculosis. So reduction of Alcohol consumption from the state of Tripura may be one of the key factors before the elimination of the Tuberculosis from India by 2025.

Limitation

As this is a case-control study there may be misclassification error in exposure measurement. As the present study is consistent with other study, it seems misclassification error was minimized during the study.

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Conflict of Interest

None declared.

Ethical Approval

The study was approved by the Institutional Ethics Committee of Agartala Government Medical College.

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