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Research Paper

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Association between Smoking, Alcoholism and Pulmonary Tuberculosis

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ABSTRACT

To observe the association between cigarette smoking, alcoholism and PTB. This study was carried out in Chest and Tuberculosis Hospital, Visakhapatnam District of Andhra Pradesh, India between 2008-2014 in patients and controls aged between 10-80 years. The medical charts of PTB in-patients were reviewed. 38% of the patients had both cigarette smoking and alcohol habit while only 12% of the controls had both smoking and alcohol habit. The data in the two groups was compared statistically. Positive association between smoker cum alcoholics and PTB was observed.

Introduction:

Tuberculosis, a disease with social implications, needs assessment of patients health status, besides clinical assessment. Tuberculosis not only affects the patient's physical health but also his socio-economic status. Individuals who are exposed to MTB are likely to be infected with TB if they have the habit of smoking. Smoking also damages the function of pulmonary alveolar macrophages, which are not only the cellular target of M.tuberculosis infection but also constitute the important early defense mechanism against the bacteria. Alcohol intake with the habit of smoking increases the risk of being affected with TB substantially. In India the habit of smoking and alcohol intake is prevalent in all strata of society which causes ill effects on health. In developing countries, prevalence of smoking and alcoholism in TB patients go hand in hand. It is important to understand the impact of smoking and alcohol intake and TB.

Material and Methods:

The present Case Control study was carried out in Visakhapatnam district of Andhra Pradesh. 100 TB patients required data was collected at 'Centre for Chest and Communicable Disease Hospital' in Visakhapatnam and its related Regional National Tuberculosis Control Program (RNTCP) centres in urban and sub urban areas of Visakhapatnam City in Andhra Pradesh.

100 Individuals visiting the Golden Jubilee Port Hospital, Visakhapatnam, for reasons other than Tuberculosis and who were never diagnosed with TB were taken as controls.

Results:

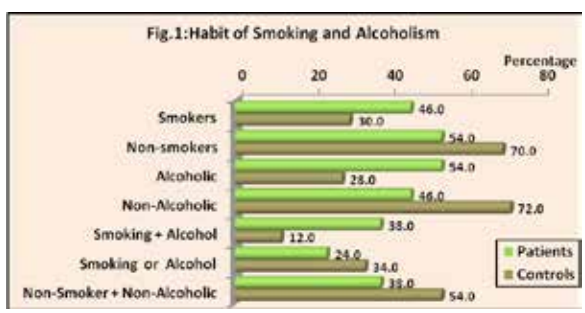
Habit of Smoking and Alcoholism

Habit of smoking and alcohol consumption as reported by the 200 individuals covered in the study is shown in Table-1.(Fig 1)

Table-1
Habit of Smoking and Alcoholism

Variable	Category	Patients (100)		Controls (100)		Chi-Square Value	P
		f	%	f	%		
SMOKING	Smokers	46	46.0	30	30.0	5.433*	0.020
	Non- smokers	54	54.0	70	70.0		
ALCOHOLISM	Alcoholic	54	54.0	28	28.0	13.973*	0.000
	Non- Alcoholic	46	46.0	72	72.0		
BOTH	Smoking + Alcohol	38	38.0	12	12.0	18.027*	0.000
	Smoking or Alcohol	24	24.0	34	34.0		
	Non-Smoker + Non-Alcoholic	38	38.0	54	54.0		

In the present sample covered, there is a significant difference in the percentage of smokers among the patients (46 percent) and among the controls (30 percent) indicating a positive association between smokers and TB. In the same way, significant difference is noticed in the percentage of alcoholics among the patients (54 percent) and among the controls (28 percent) indicating a positive association between alcoholism and TB.



Among the patients, 38 percent are habituated for both smoking and alcohol while this percentage is 12 among the controls. The percentage reporting smoking or alcohol is 24 among the patients and 34 among the controls. The percentage reporting neither of these two is 38 among patients and 54 among the controls. This distribution is also found statistically significant.

Crude & Age Adjusted Odds Ratio

The crude and age adjusted odds ratios computed for smokers and non-smokers among patients and controls are shown in Table-2.

Table-2
Crude & Age Adjusted Odds Ratio

Age (Yrs)	Patients (100)		Controls (100)		ODDS RATIO	
	S	NS	S	NS	CRUDE	Age Adj.
11 - 20	1	2	0	0	---	---
21 -30	5	19	0	3	---	---
31 - 40	11	11	0	5	---	---
41 - 50	10	8	3	9	3.750	---
51 - 60	12	7	11	25	3.896	---
61 - 70	4	7	13	25	1.099	---
71 +	3	0	3	3	---	---
Total	46	54	30	70	1.988*	3.605*
Wald's Test P Value					0.020	0.000
NB: No estimates given for the age groups where there are no smokers or non-smokers						
* Value Significant @ 5% level. (P < 0.05)						

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The Odds Ratios are found to be 3.750 in the age group of 41 to 50 years, 3.896 in the age group 51 to 60 years, 1.099 in the age group 61 to 70 years. The Crude Odds Ratio for the total samples is 1.988 and age adjusted ratio is 3.605 and both the values are found significant @ 5% level (P < 0.05). It is observed that the risk of TB is more among the smokers than in non-smokers.

Crude & Age Adjusted Odds Ratio

The crude and age adjusted odds ratios computed for smokers and non-smokers , alcoholics and non-alcoholics among patients and controls are shown in Table-3

Table-3
Crude & Age Adjusted Odds Ratio

Age (Yrs)	Patients (100)			Controls (100)			ODDS RATIO			AGE ADJUSTED ODDS RATIO		
	S + A	S or A	NS+NA	S + A	S or A	NS+NA	S + A	S or A	NS+NA	S + A	S or A	NS+NA
11 - 20	1	0	2	0	0	0	---	---	---	---	---	---
21 -30	5	3	16	0	1	2	---	---	---	---	---	---
31 - 40	10	8	4	0	3	2	---	---	---	---	---	---
41 - 50	7	6	5	1	4	7	9.800	2.100	Ref	---	---	---
51 - 60	11	3	5	7	8	21	6.600	1.575	Ref	---	---	---
61 - 70	3	2	6	3	16	19	3.167	0.396	Ref	---	---	---
71 +	1	2	0	1	2	3	---	---	---	---	---	---
Total	38	24	38	12	34	54	4.500*	1.003	Ref	5.821*	1.246	Ref
Wald's Test P Value							0.000	0.993		0.000	0.585	
NB: No estimates given for the age groups where there are no smokers or non-smokers												
Ref = Reference												
* Value Significant @ 5% level.												

Discussion:

Information from published and unpublished studies, meta-analysis and information dealing with biological pathways revealed surplus evidence to show that there is linkage between heavy drinking and incidence of active TB in both genders. The dosage of alcohol consumption is also linked to worsening of the disease Parry et al., 2009.

Lonnroth et al., 2008 proposed that low to average intake of alcohol does not associate with increase risk of TB, but there is increased risk of being effected with TB in persons who drink more than 40g or 50ml of alcohol per day, which leads to alcohol dependent disorder. Studies on pulmonary TB cases reported higher odds ratio than studies that included all type of TB, but it was not statistically significant when small studies were excluded to adjust possible publication bias. Significant heterogeneity was found in the high-exposure category which could not be explained by further subgroup analysis. Bias caused by different theories for the selection of controls in the case-control studies could have contributed to the heterogeneity. In the present study it is noticed that the habit of drinking alcohol is associated with the development of TB.

Many of the case-control studies used hospital controls or controls included among other groups like prisoners or social service individuals who have higher alcohol intake levels than the general population. Studies that analysed important factors like age, sex, HIV, socio-economic status and smoking had similar to higher but not significantly different pooled effect sizes. Socio economic status is difficult to measure. There are some risk factors for TB disease that were not analysed in many studies. For example Malnutrition (Cegielski et al., 2004), Diabetes (Stevenson et al., 2007), and indoor air pollution (Lin et al., 2007) are some factors which are associated with higher risk of TB disease. Mental health disorders may also be involved with higher risk of TB, through impact of immune system (Schuckit 2006, Prince et al., 2007). Some factors which are on the casual pathways show that alcohol use disorder can lead to socio-economic downward drift that leads to malnutrition. Other well known risk factor for TB such as silicosis, malignancies and immune-suppressant treatment are rare to influence the results significantly. The pooled effect size in high exposure studies that had control for infection status, suggests that the possible casual pathways through which alcohol operates as a risk factor for TB, is through increased progression from infection to disease.

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