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OBSERVATIONAL STUDY ON PERVALENCE OF DIABETES MELLITUS IN TUBERCULOSIS PATIENTS

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ABSTRACT

Background: The link between diabetes mellitus and tuberculosis has been recognized for centuries. Increasing prevalence of Diabetes Mellitus is a challenging task for Tuberculosis management. **Objective:** The objective of the study includes comparison of diabetes prevalence among tuberculosis patients across age, sex, Body Mass Index, sputum positive pulmonary tuberculosis and retreatment cases. **Methods:** The study was conducted at the Department of Pulmonology, in a tertiary care teaching hospital, Tamil Nadu for 4 months. All the patients diagnosed with tuberculosis including pulmonary tuberculosis and extra pulmonary tuberculosis was included in the study. Variables such as age, sex, height and weight were recorded for each patient. The significance of association of different factors was found out by chi-square test. A P-value of <0.05 was considered as statistically significant. **Results:** The prevalence of diabetes in tuberculosis patients was found to be 32.89%. There was a statistically significant association of diabetes with older age, higher BMI and sputum positivity. **Conclusions:** The high prevalence of Tuberculosis is associated with uncontrolled DM. Routine screening of Diabetes in Tuberculosis patients is very important improve public health care.

KEYWORDS: Tuberculosis; Diabetes Mellitus; Sputum positive pulmonary tuberculosis.

INTRODUCTION

India is one of the highest TB burden country accounting for one fifth of the global incidence. The global burden of diabetes mellitus by the WHO in 1998, projected that the prevalence of diabetes among adults worldwide will more than the double from 135 million (41%) to 300 million (5.4%) by the year of 2025. [1] In India it is estimated that the prevalence of Diabetes Mellitus is ranging from 5.6 to 12.4% in urban area and still lower in rural area.[2]

Diabetes mellitus is one of the independent risk factor for developing lower respiratory tract infections.[3] Among that tuberculosis occurs with an increased frequency in diabetics and cause a higher mortality rate and may induce glucose intolerance and worsen glycemic control in people with diabetes.[1] The increased incidence of pulmonary tuberculosis in diabetics may be due to defects in host defenses and immune cell functions.[4,5]10% reported cases of Tuberculosis are associated with Diabetes Mellitus.[6]

A number of studies were conducted worldwide have shown higher prevalence of DM in Tuberculosis patients than general population. We have conducted this study to know the prevalence of Diabetes Mellitus in our area.

METHODS

The study was conducted at the Department of Pulmonology, in a tertiary care teaching hospital, Tamil Nadu. Duration of the study was 4 months from April 2017 to July 2017. All the patients diagnosed with tuberculosis including pulmonary tuberculosis and extra pulmonary tuberculosis was included in the study. Variables such as age, sex, height and weight were recorded for each patient. The body mass index categorized as per the recommended cut offs by WHO (underweight: <18 kg/m2. normal: 18.0-24.9 kg/m2, overweight: >25kg/m2). The diagnostic criterion for Diabetes was fasting plasma glucose above 126mg/dl or 2–h plasma glucose (200mg/dl) or already diagnosed as diabetic.[7]

Tuberculosis patients were divided into sputum smear positive pulmonary tuberculosis, sputum negative pulmonary tuberculosis and extra pulmonary tuberculosis according to Revised National Tuberculosis Control Programme diagnostic criteria.[8] New and re-treatment cases are noted separately.

The data were analyzed by using Graph pad prism software. The significance of association of different factors was found out by chi-square test. A P-value of <0.05 was considered as statistically significant.

RESULTS

Table 1: Characteristics of tuberculosis patients.

	Categories	Frequency	%
Age group (year)	<20	14	9.2
	21-30	14	9.2
	31-40	24	15.8
	41-50	32	21.0
	51-60	36	23.7
	>60	32	21.0
Sex	Male	96	63.15
	Female	56	36.84
BMI	</=18.5	57	37.5
	18.5-24.9	88	57.89
	>25	7	4.60
Type of TB	Sputum positive pulmonary	74	48.67
	Sputum negative pulmonary	62	40.79
	Extra pulmonary	16	10.53
Treatment category	New cases	134	88.16
	Retreatment cases	18	11.84
	Total	152	

Out of the total 152 tuberculosis patients included in the study, 50 patients were diabetics and the prevalence of diabetes was found to be 32.89%. The characteristics of study population were shown in Table 1.

The mean age of the tuberculosis patients was 46.97 years. 50% of tuberculosis patients were aged less than 50 years. Male represent 63.16% of the total study population. The proportion of tuberculosis patients with BMI <18.5 was 37.5%. The patients having extra pulmonary tuberculosis were only less.

The comparison of diabetes mellitus prevalence among tuberculosis patients across different groups is shown in Table 2.

Table 2: Comparison of diabetes mellitus prevalence among tuberculosis patients across different groups.

Categories	Number of TB patients	Number of TB patients with DM	P Value
Age group (year)			0.036
<20	14	0	
21-30	14	0	
31-40	24	8	
41-50	32	14	
51-60	36	12	

>60	32	16	
Sex			0.25
Male	96	36	
Female	56	14	
BMI			0.0056
</=18.5	57	7	
18.5-24.9	88	38	
>25	7	5	
Type of TB			0.0038
Sputum positive pulmonary	74	32	
Sputum negative pulmonary	62	11	
Extra pulmonary	16	7	
Treatment category			0.4
New cases	134	42	
Retreatment cases	18	8	
Total	**152**	**50**	

The mean age of patients with diabetes was 53.32 years, in which a higher prevalence of diabetes was seen in older population and it is statistically significant (P value = 0.036). Among that patients with BMI 18.5-24.9 was more i.e., 76%. The higher BMI in diabetic patients was also found to be statistically significant (P-value= 0.0056).

In 50 diabetic patients, sputum positive pulmonary tuberculosis were high in number (32 patients- 64%) which was statistically significant (P-value=0.0038). New case of TB were reported in 42 (84%) diabetic patients and 8 (16%) were in retreatment category. There was no statistically significant relation in the treatment category with diabetics as well as gender.

DISCUSSION

In the present study the prevalence of diabetes in tuberculosis was found to be 32.89%. Thus, the prevalence of diabetes mellitus in tuberculosis patients is high in this study compared to studies reported in Tamil Nadu, Pondicherry and Saudi Arabia.[9-11] Another 2 studies were also reported from Kerala, India, which has a higher prevalence of 44% and 35.6%.[12]

Our study shows a significantly higher prevalence of diabetes in older TB patients. Similar results were found from studies conducted in India and other Asian countries.[13-16] Increased health care facilities, better living conditions and life style changes may lead to increased prevalence of diabetes mellitus. The incidence of tuberculosis in diabetics can be decreased by routine screening and detecting pre-diabetic stage.

Tuberculosis with diabetic patients shows higher BMI in our study and which was statistically significant. Similar results have reported in an Indonesian study.[14] Our study report suggest that in diabetic patients if they are having higher BMI, then screening of TB is necessary.

The number of sputum positive pulmonary tuberculosis was 32 out of 50 diabetes with TB patients. It indicates the importance of screening and identifying pulmonary tuberculosis in the public health. A study from china also reported the similar results of increased incidence of sputum positive pulmonary tuberculosis.[17] Our study shows only 8 case of retreatment in diabetic group out of 18 of the total. Many of the studies have shown high incidence of retreatment case in diabetes.[17,18]

At the time of diagnosis of tuberculosis, many people were unaware of their diabetic status i.e. earlier detection and patient education may prevent the attack of tuberculosis. Our study findings clearly underline the need to improve the care of patients with concomitant DM and TB, as the DM is gradually increasing the risk of TB among our population.

CONCLUSION

Diabetes is one of the co-morbidity in people with tuberculosis. As the symptoms of one disease mimic those of the other, we conclude that the screening for diabetes in tuberculosis patients is very important especially in developing countries.

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