

Prevalence of pulmonary diabetes mellitus in tuberculosis patients attending tertiary care institute

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Abstract

Introduction: The link between diabetes mellitus and pulmonary tuberculosis has been talked of at various fora but has never occupied the centre-stage of discussions. Presently, an epidemic of diabetes is on both in developed and developing nations. With the recognition of this explosive, increase in the number of people diagnosed with diabetes mellitus all over the world, a whole new field of issues related to interaction between diabetes and pulmonary tuberculosis has been thrown open. **Aims and Objective:** To study the prevalence of diabetes mellitus among patients suffering from tuberculosis and receiving treatment at tertiary care institute. **Material and Method:** The present cross sectional study was conducted in the NIMS Medical Hospital. For the purpose of study the all TB cases more than 18 years of age, including new and retreatment cases, sputum positive, sputum negative and extrapulmonary cases were enrolled. All of these were screened for diabetes using the diagnostic criteria of a fasting plasma glucose level of ≥ 126 mg/dl or a self reported history of taking antidiabetic drugs after diagnosis by a medical professional. Information regarding age, sex, family history of diabetes, alcohol and smoking was recorded. Family history of diabetes was enquired in all subjects. Physical parameters like height, weight, body mass index (BMI), waist circumference, hip circumference and waist hip ratio were recorded. **Results:** It was observed that out of 189 patients 41 patients were diabetic. Thus the prevalence of diabetes mellitus in TB patients was 21.69%. The mean age of patients suffering from DM with Tb was 48.6 ± 11.7 years whereas in non diabetic TB patient was 42.4 ± 13.4 . Majority of the patients in DM with Tb and non diabetic TB group were on category I treatment (75.61% and 77.03%). Family history of diabetes was reported by 34.15% diabetic patients. Alcoholism was observed commonly in diabetic patients as compared to non diabetic patients with statistically significant difference. 31.71% diabetics were either overweight or obese whereas only 14.19% nondiabetic Tb patients were either overweight or obese. **Conclusion:** The prevalence of diabetes mellitus in TB patients was 21.69%. Thus diabetes is a common comorbidity in people with TB and early detection of diabetes should be aimed by screening patients with TB with fasting blood sugar estimation. Family history of diabetes and overweight and obesity were the common risk factors observed in diabetic TB patients.

Keywords: Diabetes mellitus, tuberculosis, prevalence.

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Received Date: 04/04/2015 Revised Date: 17/04/2015 Accepted Date: 20/04/2015

Access this article online

Quick Response Code:	Website: www.statperson.com
	DOI: 22 April 2015

INTRODUCTION

Diabetes mellitus (DM) is becoming a global epidemic and India, in particular, is noted as hosting a high proportion of this disease burden. There are approximately 41 million prevalent cases of DM in India and as per the International Diabetes Federation (IDF) estimates by 2025 this will rise to about 70 million, the largest number for any country¹. As a consequence of urbanization as well as social and economic development, there has been a rapidly growing epidemic of diabetes mellitus (DM)^{2,3}. Available data suggest that an estimated 11% of urban people and 3% of rural people above the age of 15 years have DM. India has the largest number of TB cases in the world (estimated at 2.0 million per

annum) with an incidence rate of 168/100,000 per year for 2009⁴. The link between diabetes mellitus and pulmonary tuberculosis has been talked of at various fora but has never occupied the centre-stage of discussions. Presently, an epidemic of diabetes is on both in developed and developing nations. With the recognition of this explosive, increase in the number of people diagnosed with diabetes mellitus all over the world, a whole new field of issues related to interaction between diabetes and pulmonary tuberculosis has been thrown open.⁵ Systematic reviews have shown scientific evidence of the linkages between the two diseases. Diabetes and tuberculosis may complicate each other at many levels. Among those with active TB, diabetes may adversely affect TB treatment outcomes by delaying the time for microbiological response, reducing the likelihood of favorable outcome and increasing the risk of relapse, death and drug resistance.^{6,7} Thus the present study was conducted to study the prevalence of diabetes mellitus in tuberculosis patients.

AIMS AND OBJECTIVE

To study the prevalence of diabetes mellitus among patients suffering from tuberculosis and receiving treatment at tertiary care institute.

MATERIAL AND METHOD

The present cross sectional study was conducted in the NIMS Medical Hospital. For the purpose of study the TB cases enrolled in the DOTS center were selected by using following selection criteria

- All TB cases more than 18 years of age,
- Including new and retreatment cases, sputum positive, sputum negative and extrapulmonary cases.

Thus total 189 patients were selected. And all of these were screened for diabetes using the diagnostic criteria of a fasting plasma glucose level of ≥ 126 mg/dl⁸ or a self reported history of taking antidiabetic drugs after diagnosis by a medical professional. Before starting the study all participants were informed about the study and informed written consent was obtained. All the willing participants were interviewed using the pretested questionnaire. The questionnaire contained the information about age, sex, family history of diabetes, alcohol and smoking. Family history of diabetes was enquired in all subjects. Physical parameters like height, weight, body mass index (BMI), waist circumference, hip circumference and waist hip ratio were recorded. Collected data was entered in Microsoft excel 2007 and analyzed using Statistical Package for the Social Sciences software (SPSS v17.0).

RESULTS

Table 1: Prevalence of diabetes mellitus in TB patients

	No. of TB patients	Parentage
DM	41	21.69%
No DM	148	78.31%
Total	189	100.00%

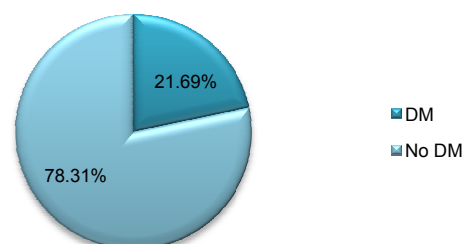


Figure 1: Prevalence of diabetes mellitus in TB patients

In the present study total 189 patients were enrolled who were receiving anti tubercular treatment in our institute. It was observed that out of 189 patients 41 patients were diabetic. Thus the prevalence of diabetes mellitus in TB patients was 21.69%

Table 2: Distribution according to age, sex and treatment category

Variable	TB patients		P value
	With DM	With no DM	
Age	48.6 \pm 11.7	42.4 \pm 13.4	0.004*
Sex	Male 29 (70.73%)	102 (68.92%)	0.823
	Female 12 (29.27%)	46 (31.08%)	
Treatment category	Cat I 31 (75.61%)	114 (77.03%)	0.625
	Cat II 10 (24.39%)	34 (22.97%)	

* Significant.

The mean age of patients suffering from DM with Tb was 48.6 \pm 11.7years whereas in non diabetic TB patient was 42.4 \pm 13.4. And the difference observe was also statistically significant. Majority of the patients in the study were male. Majority of the patients in DM with TB and non diabetic TB group were on category I treatment (75.61% and 77.03%).

Table 3: Distribution according various risk factors

Risk factor	TB patients		P value
	With DM	With no DM	
F/H of DM	14 (34.15%)	26 (17.57%)	0.021
No F/H of DM	27 (65.85%)	122 (82.43%)	
Smoker	17 (41.46%)	51 (34.46%)	0.408
Non smokers	24 (58.54%)	97 (65.54%)	
Alcoholics	25 (60.98%)	63 (42.57%)	0.036
Non alcoholics	16 (39.02%)	85 (57.43%)	
Over weight/obese	13 (31.71%)	21 (14.19%)	0.009
Normal	28 (68.29%)	127 (85.81%)	

*Significant.

Family history of diabetes was reported by 34.15% diabetic patients, which was much higher as compared to non diabetic TB patients and the difference was also statistically significant. It was seen that 41.46% and 34.46% patients were smokers in diabetic and non diabetic group respectively. Alcoholism was observed commonly in diabetic patients as compared to non diabetic patients with statistically significant difference. It was evident from the table that 31.71% diabetics were either overweight or obese whereas only 14.19% nondiabetic Tb patients were either overweight or obese.

DISCUSSION

The present study was conducted in the **ABC medical college and hospital**. There were total 189 patients in the study who were receiving anti tubercular treatment (including old and newly diagnosed). It was observed that out of 189 patients 41 patients were diabetic. Thus the prevalence of diabetes mellitus in tb patients was 21.69%. In Tamil Nadu, crude prevalence rates of diabetes and pre-diabetes in TB patients were found to be 25% and 24% respectively which was comparable with the present study.⁹ According to Balakrishnan S *et al*¹⁰ prevalence of diabetes in tuberculosis patients by measuring HbA1c was 44%. In a study by Jain *et al*¹¹ reported a prevalence of impaired glucose tolerance (IGT) of 16.98% and they had used oral glucose tolerance test to diagnose IGT. Though wide variation in the prevalence of diabetes in Tb patients was observed, it was higher as compared to general population prevalence (10%). The mean age of patients suffering from DM with Tb was 48.6±11.7years whereas in non diabetic TB patient was 42.4±13.4. And the difference observe was also statistically significant. Thus the prevalence of diabetes was significantly higher in older patients. Majority of the patients I the study were male. Majority of the patients in DM with Tb and non diabetic TB group were on category I treatment (75.61% and 77.03%). Family history of diabetes was reported by 34.15% diabetic patients, which was much higher as compared to non diabetic TB patients and the difference was also statistically significant. It was seen that 41.46% and 34.46% patients were smokers in diabetic and non diabetic group respectively. Alcoholism was observed commonly in diabetic patients as compared to non diabetic patients with statistically significant difference. It was evident from the table that 31.71% diabetics were either overweight or obese whereas only 14.19% nondiabetic Tb patients were either overweight or obese. Alisjhabana *et al*¹² also reported a significantly higher median BMI in TB with DM patients when compared to nondiabetic TB patients. Patients with diabetes mellitus have been found to have a higher than average risk of contracting tuberculosis. A meta-analysis demonstrated

that having diabetes was associated with an overall relative risk (RR) of 3.11 for contracting TB.⁷ Association of diabetes affects the outcome of tuberculosis. A delay in sputum conversion was observed in TB patients with diabetes by Dooley *et al*.¹³ According to Alisjhabana *et al*¹², a comparatively higher proportion of subjects with TB and DM had treatment failures, deaths compared with those without diabetes in Indonesian population.

CONCLUSION

The prevalence of diabetes mellitus in TB patients was 21.69%. Thus diabetes is a common comorbidity in people with TB and early detection of diabetes should be aimed by screening patients with TB with fasting blood sugar estimation. Family history of diabetes and overweight and obesity were the common risk factors observed in diabetic TB patients.

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Source of Support: None Declared
Conflict of Interest: None Declared