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RESEARCH ARTICLE

High Diabetes prevalence among males Tuberculosis patients in East Medinipur District of West Bengal, India

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Manuscript Info	*Abstract*
	India accounts for nearly one-third of global burden of Tuberculosis. Recently numbers of studies reported that subject allied with diabetes were at three fold higher risk of developing Tuberculosis. Apart that, studies also revealed that screened for Diabetes among Tuberculosis patients reported a wide range of Diabetes incidence among Tuberculosis patients ranging from 1.9% to as high as 35%. The present research study was conducted to determined the prevalence of Diabetes in Tuberculosis in males patients under Revised National Tuberculosis Control Programme (RNTCP) in East Medinipur district of West Bengal, India. Summarised result can observed, among 363 Tuberculosis patients 45(12.4%) are diabetic and 318 (87.6%) are non diabetic. Where as Diabetes was more prevalent among Males than Females (11.3% vs 1.1%).

INTRODUCTION

Tuberculosis or TB is a common and in many cases fatal, infectious disease caused by the bacteria *Mycobacterium tuberculosis* (Kumar et al, 2007). Tuberculosis typically attacks the lungs, but can also affect other parts of the body. It spreads through the air when people who have an active TB infection cough, sneeze, or otherwise transmit respiratory fluids through the air (WHO, 2010). One third of the world's population is thought to have been infected with M. *tuberculosis*, with new infections occurring in about 1% of the population each year (WHO, 2002). In 2007, there were an estimated 13.7 million chronic active cases globally (WHO, 2009), while in 2010, there were an estimated 8.8 million new cases and 1.5 million associated deaths, mostly occurring in developing countries(WHO,2011). India has approximately two to three million people infected with tuberculosis and bears a disproportionately large burden of the world's tuberculosis rates. India is the highest TB burdened country with World Health Organization (WHO) statistics for 2011 giving an estimated incidence figure of 2.2 million cases of TB for India out of a global incidence of 8.7 million cases.

Diabetes mellitus (DM), or simply diabetes, is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do- not respond to the insulin that is produced(David et al,2011). Many studies reported that subjects with diabetes were at threefold higher risk of developing TB. In addition, studies that screened for DM among TB patients reported a wide range of DM prevalence among TB

patients, ranging from 1.9% to as high as 35% [Konatantinos,2010]. A secondary data analysis on Indian population revealed that with an estimated 21 million adults with DM and 900,000 incident pulmonary tuberculosis (PTB) cases in 2000, 14.8% of the existing TB burden could be attributed to diabetes(Stevenson et al, 2007). It is necessary to consider the prevalence of diabetes in patients with tuberculosis since diabetes is associated with an increased risk of TB treatment failure and death during tuberculosis treatment, as well as an increased risk of relapse. A study from Jaipur, Rajasthan, which followed up TB cases taking Category I (new) and II (retreatment) for 2 years, reported diabetes as one of the associated factors for relapse of TB cases (Meena et al,2011). Similar findings were also reported in a study conducted amongst Chinese population (Zhang et al, 2009). Screening for DM in TB patients could improve DM casedetection and early treatment and indirectly lead to better TB specific treatment outcomes (Ruslami et al, 2010).This study was planed to determine the prevalence of Diabetes amongst a cohort of TB patient registered in selected Tuberculosis Unit (TUs) of Revised National Tuberculosis control Programme (RNTCP) in East Medinipur , West Bengal, India

Materials and methods:
Study area
 East Midnapore has 9 Tuberculosis Units (TU). Three of these nine TUs were selected at random for undertaking the present study. The three TUs were Egra, Moyna and Paikparim that covers the population approx 15 lakhs .

 Egra TU is situated in the north/east/west/south of the district. It serves two blocks namely Egra-I, Egra-II and Pataspur-II catering to a population of 600975. It is a predominantly urban TU having its headquarters at Egra which is 90 kms away from the district town of Tamluk.

Moyna TU is situated in the north/east/west/south of the district. It serves two blocks namely Moyna and Nandakumar, catering to a population of 496143. It is a predominantly rural TU having headquarters at Gar Moyna which is 20 kms away from the district town of Tamluk.

Paikpari TU is situated in the north/east/west/south of the district. It serves two blocks namely Panskura-1 and Panskura-II catering to a population of 622989. It is a predominantly rural TU having headquarters at Uttar Mechogram which is 35 kms away from the district town of Tamluk
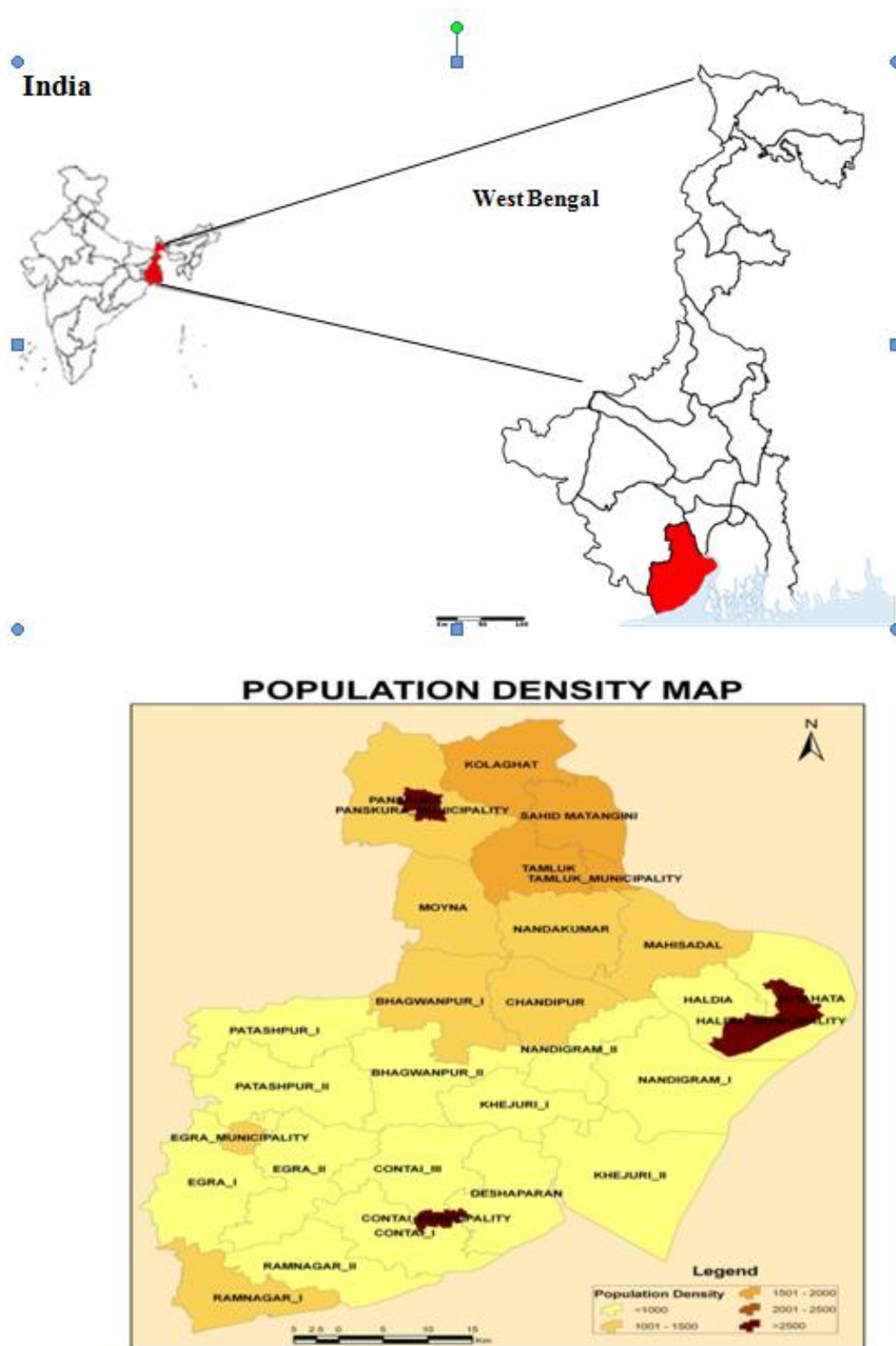
Fig 1 Location of Selected Tuberculosis Units (T.U.) of East Midnapur District, West Bengal, India.

Study population:

All patients registered in the Tuberculosis Register of the three study units.

Study period

Survey was conducted throughout 36 Months (2011- 2013).

Study design

This cross-sectional study was designed to collect data from the TB of all patients registered under the RNTCP.

Study variables

The study variables collected for the present study were

01. Name & Address
02. Age
03. Sex
04. Occupation
05. Family members
06. Earning members
07. Monthly income
08. Pulmonary / Extra Pulmonary
09. Category
10. Result of Diagnosis
11. Blood Sugar Status (P.P.)
12. HIV Status

Study tools :

a. Predesigned and pretested
   proformas to collect data from the   tuberculosis registers.
b. Lancet, syringe, needles Colorimeter, Auto-Analyzer, Glucometer and chemicals for collection and examination of blood sugar.

Diagnosis of Diabetes:

There are three types of Glucose tests done after or before TB treatment was started. This glucose tests done various private or government laboratories.

❖ **Fasting Glucose Test** – Measures the glucose in a blood sample taken when a patient not had anything to eat or drink (except water) for at least eight hours.

❖ **Random Glucose Test** – Measures the glucose in a blood sample taken when patient have been eating on the usual schedule.

❖ **Post Prandial (P.P.) Glucose Test**: Measures the glucose in a blood sample from a T.B patient after two hours given a drink of 75 gms. glucose.

A diagnosis of diabetes based on any of the following test results confirmed by re-testing on a different day.

- ➢ A fasting blood glucose level of **126** milligram per deciliter (mg/dl) or higher.
- ➢ A random blood glucose of **200** mg / dl or higher.
- ➢ A post prandial (P.P.) glucose level of **200** mg/dl or higher.

Data analysis:

After the data had been collected from each facility, the results were entered inMS- Excel software (Microsoft Corp.) Data analysis was done using the MS-Excel. Both tabular and graphic presentations were made from the quantitative data. Means (averages), medians, ranges and proportions for the variables were generated using the Epi-info software. Comparison between the facilities was done using the chi-square test (3*2 tables). Bar graphs were created using Microsoft Excel that showed how the indicators in the different facilities might vary.

Results : Sample survey and lab experimental out come are depicted in table format.

Table 1 shows that out of 363 Tuberculosis patients 45 (12.4%) were diabetic and 318 (87.6%) were non-diabetic. Out of 363 Tuberculosis diagnosed patient 70(19.3%) were sputum negative,25(6.9%) were sputum positive but scanty,161(44.4%) were 1+ positive,44(12.1%) were 2+ positive,63(7.4%) were 3+ positive.

Table 2 shows that diabetic occur more in males Tuberculosis patients than females (11.3% Vs 1.1%). Out of 363 Tuberculosis diagnosed patient, Tuberculosis was mostly occur in males was 280(77.1%) than females(22.9%).

Variable		Number	%
Disease type	Pulmonary	324	89.3
	Extra pulmonary	39	10.7
Category	I	323	89.0
	II	40	11.0
Sputum grade at diagnosis	Negative	70	19.3
	Scanty	25	6.9
	1+	161	44.4
	2+	44	12.1
	3+	63	17.4
Diabetes	Diabetes	45	12.4
	Non-diabetes	518	87.6
HIV	Reactive	14	3.9
	Non-reactive	349	96.1

Table 1: **Disease characteristics of the cohort**

Variable		Male	Female	Chi Square	p- value
Disease type	Pulmonary	258	66	10.64	0.01*
	Extra pulmonary	22	17		
Category	I	246	77	1.58	0.21
	II	34	6		
Sputum grade at diagnosis	Negative	46	24	10.12	0.04*
	Scanty	16	9		
	1+	125	36		
	2+	35	9		
	3+	38	5		
Diabetes	Diabetic	41	4	5.69	0.02*
	Non-diabetic	239	79		
HIV	Reactive	10	4	0.27	0.60
	Non-reactive	270	79		

Table 2: Differences in disease characteristics among males and female diabetic tuberculosis patients.

Discussions:

The study shows an association between DM and TB . Also there is a substantial evidence to support the fact that diabetes is an important risk factor for TB (Jeon et al. 2008). Conversely, it also possible that TB can induce glucose intolerance and also deteriorate glycemic control in subject with diabetes, (Dooley et al. 2009). Previously there is no data from this area on prevalence of DM among TB patients.

The present study shows that prevalence rate of DM is 12.4% among TB patients registered under RNTCP in threes T.U. of East Midnapur district of West Bengal, India. Diabetes was more prevalent among men than women (11.3% Vs 1.1%).

Alijahbana et al. (2007) reported prospective data a cohort of patients with TB in Indonesia the prevalence of confirmed DM among patients with TB is 14.8% compared with 3.2% in general population. A national wide INDIAB study (Anjana et al. 2011) conducted in general population in Tamil Nadu, South India, shows that the prevalence rate of diabetes is 10.4%.

Conclusion:

In conclusion the study revealed that about 12.4% of TB patient have diabetes. Diabetes was more prevalent among men than women (11.3% vs 1.1%). Moreover those with TBDM (Tuberculosis and Diabetes Mallitus) were more likely to have the infective form of TB. These finding pose a great challenge for TBDM control in India.

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