



## A COMPARATIVE STUDY OF CLINICO-RADIOLOGICAL PROFILE OF PULMONARY TUBERCULOSIS IN DIABETIC AND NON DIABETIC ADULTS

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### ABSTRACT

Atypical presentation of pulmonary tuberculosis in diabetics makes the diagnosis of Tuberculosis difficult at times. Given the public health implications of a causal link between Diabetes and Tuberculosis, there is a clear need for the knowledge of this atypical presentation. Results revealed high incidence of hemoptysis in diabetics compared to non-diabetics. Constitutional symptoms were found to be less in diabetics than non-diabetics. Bacteriologically, high bacillary load (3+) was found in diabetics than non-diabetics. Radiologically, the incidence of bilateral involvement, lower zone involvement and cavitation was found to be significantly more common in diabetics than non-diabetics. The above findings of more cavitary lesions and high bacillary load in diabetics increase the infectiousness of the disease. Now Diabetes being an established risk factor for tuberculosis, dissemination of knowledge of atypical presentation of Tuberculosis among diabetics is important for early diagnosis and preventing the spread of tuberculosis in the community.

**KEYWORDS:** Atypical presentation, Lower zone Tuberculosis, Diabetes



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## INTRODUCTION

Despite the availability of effective therapy, Tuberculosis (TB) continues to infect an estimated one-third of the world's population, to cause disease in 8.8 million people per year, and to kill 1.6 million of those affected<sup>1</sup>. Current TB control measures focus on the prompt detection and treatment of those with infectious forms of the disease to prevent further transmission of the organism. Despite the enormous success of this strategy in TB control, the persistence of TB in many parts of the world suggests the need to expand control efforts to identify and address the individual and social determinants of the disease. Since the early part of the 20th century, clinicians have observed an association between Diabetes mellitus (DM) and TB, although they were often unable to determine whether DM caused TB or whether TB led to the clinical manifestations of DM<sup>2</sup>. A causal link between DM and TB does not bode well for the future, as the global burden of DM is expected to rise from an estimated 180 million prevalent cases currently to a predicted 366 million by 2030. Experts have raised concerns about the merging epidemics of DM and TB especially in low- to middle-income countries, such as India and China that are experiencing the fastest increase in DM prevalence and the highest burden of TB in the world. There are differences in the clinical and radiological presentation of diabetic patients developing tuberculosis in comparison to the general population. Thus such atypical presentation of pulmonary tuberculosis in diabetics makes the diagnosis of Tuberculosis difficult at times. Given the public health implications of a causal link between DM and TB, there is a clear need for

the knowledge of the clinico-radiological presentation of Pulmonary Tuberculosis in Diabetics.

## MATERIALS AND METHODS

This study was conducted in two groups. Group A was patients of pulmonary tuberculosis with diabetes mellitus and Group B was patients of pulmonary tuberculosis without diabetes mellitus. 52 patients in group A and 48 patients in group B were included in the study. After obtaining the informed consent, all patients were subjected to detailed history taking, sputum AFB (2 samples), Chest X Ray PA view.

### *Inclusion criteria (Group A)*

1. Smear positive pulmonary tuberculosis.
2. Age >18 years
3. Patients diagnosed to have Diabetes according to WHO guidelines

### *Inclusion criteria for (Group B)*

1. Smear positive pulmonary tuberculosis.
2. Age >18 years
3. Patients who were ruled out for presence of Diabetes.

### *Exclusion criteria (for both groups)*

1. Age <18 years.
2. Seropositive subject (HIV/AIDS)
3. Chronic liver/renal failure
4. Chronic steroid/immunosuppressive therapy
5. Connective tissue disorders
6. Malignancies
7. Pregnancy

## RESULTS

**Table 1**  
**Demographic clinical characteristics**

| Variables                               | Diabetic group | Non Diabetic group | p-value |
|---|----------------|--------------------|---------|
| Age, yrs                                | 49.6±12.9      | 36.1±14.6          | <0.001  |
| Fasting Blood Sugar (FBS), mg/dl        | 165.9±34       | 96.0±19.5          | <0.001  |
| Post Prandial Blood Sugar (PPBS), mg/dl | 277.4±73.6     | 137.0±27.9         | <0.001  |
| Male, n %                               | 33(63.5)       | 26(54.2)           | 0.327   |
| Female, n %                             | 19(36.5)       | 22(45.8)           |         |

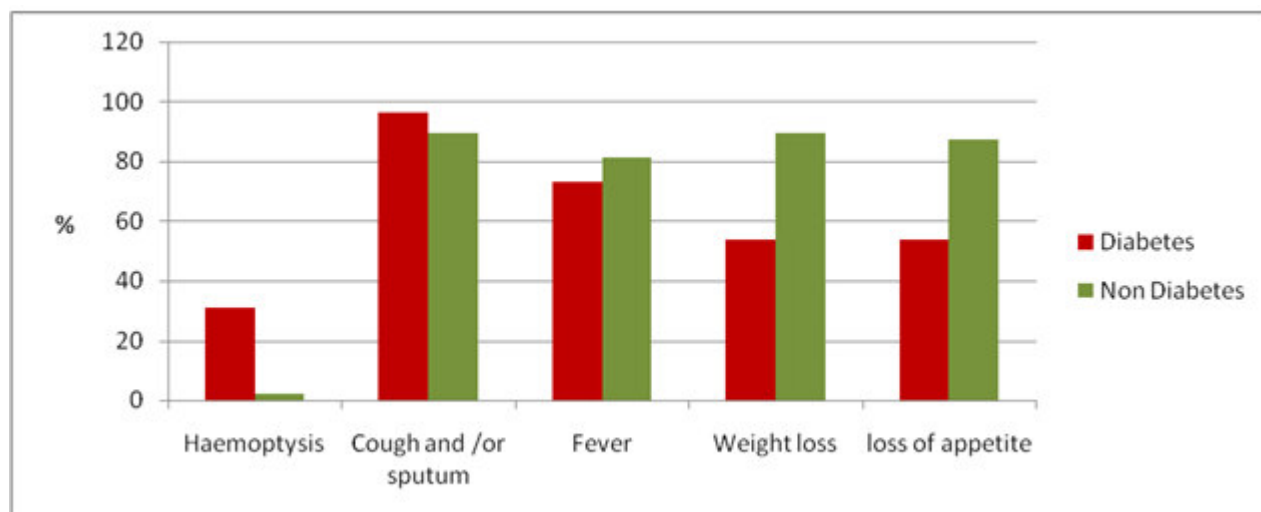
Table 1 compares the demographic and clinical characteristics of both the groups. There is a significant difference between age (49.6±12.9 Vs 36.1±14.6, p<0.001), Fasting blood sugar (165.9±34 Vs 96.0±19.5, p<0.001) and Post Prandial Blood Sugar (277.4±73.6 Vs 137.0±27.9, p<0.001) among two groups viz. diabetics and non-diabetics. However, no significant difference was observed for gender.

**Table 2**  
**Symptomatology Characteristics**

| Variables                 | Diabetic group | Non Diabetic group | p-value  |
|---------------------------|----------------|--------------------|----------|
| Haemoptysis, n %          | 16(30.8%)      | 1(2.1%)            | <0.001** |
| Cough and /or sputum, n % | 50(96.2%)      | 43(89.6%)          | 0.336    |
| Fever, n %                | 38(73.1%)      | 39(81.3%)          | 0.241    |
| Weight loss, n %          | 28(53.8%)      | 43(89.6%)          | <0.001** |
| loss of appetite, n %     | 28(53.8%)      | 42(87.5%)          | <0.001** |

Table 2 compares the symptomatology characteristics of Diabetics (DM) and non-diabetics. The results revealed a statistical significant difference in hemoptysis (31% Vs 2%, p<0.001), weight loss (53.8% vs 89.6%,) p<0.001) and loss of appetite (53.8% vs 87.5%, p<0.001) between diabetic and non-diabetic group. However, cough with or without sputum and fever did not significantly differ between the groups.

**Figure 1**  
**Symptoms distribution**

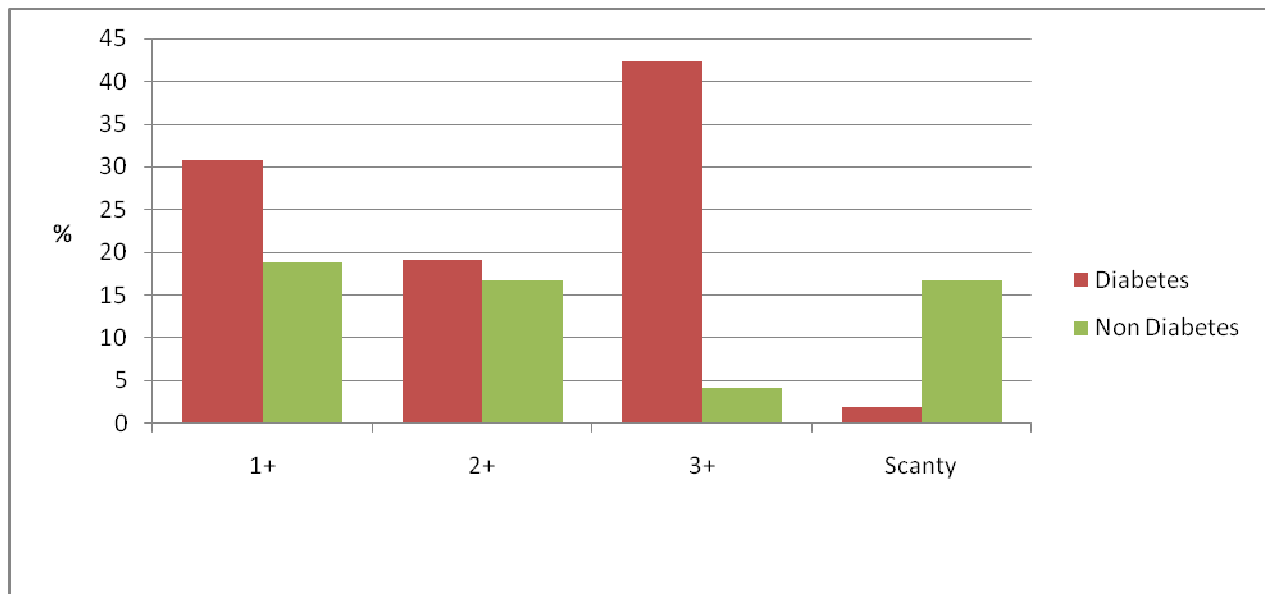


**Table 3**  
**Bacillary load**

| AFB SMEAR | Group A (Diabetes) | Group B (Non Diabetes) | p-value  |
|-----------|--------------------|------------------------|----------|
| 1+        | 16(30.8)           | 9(18.8)                | <0.001** |
| 2+        | 10(19.2)           | 8(16.7)                |          |
| 3+        | 22(42.3)           | 2(4.2)                 |          |
| N         | 3(5.8)             | 21(43.8)               |          |
| S         | 1(1.9)             | 8(16.7)                |          |
| Total     | 52(100)            | 48(100)                |          |

Table 3 shows the comparison of bacillary load between the two groups. It is observed that the high bacillary load (3+) was found to be more in diabetic group than non-diabetics (42.3% vs 4.2%) which was statistically significant ( $p < 0.001$ )

**Figure 2**  
**Comparison of Bacillary load**



#### 4. Comparison of Radiology characteristics

**Table 4.1**  
**Comparison of side preference**

| CHEST X RAY – SIDE | DM (n= 52)  | NON-DM(n=48) |
|--------------------|-------------|--------------|
| Right side         | 18 (34.6 %) | 19(39.5%)    |
| Left               | 14 (26.9 %) | 24(50%)      |
| Bilateral          | 20 (38.5%)  | 5(10.4%)     |

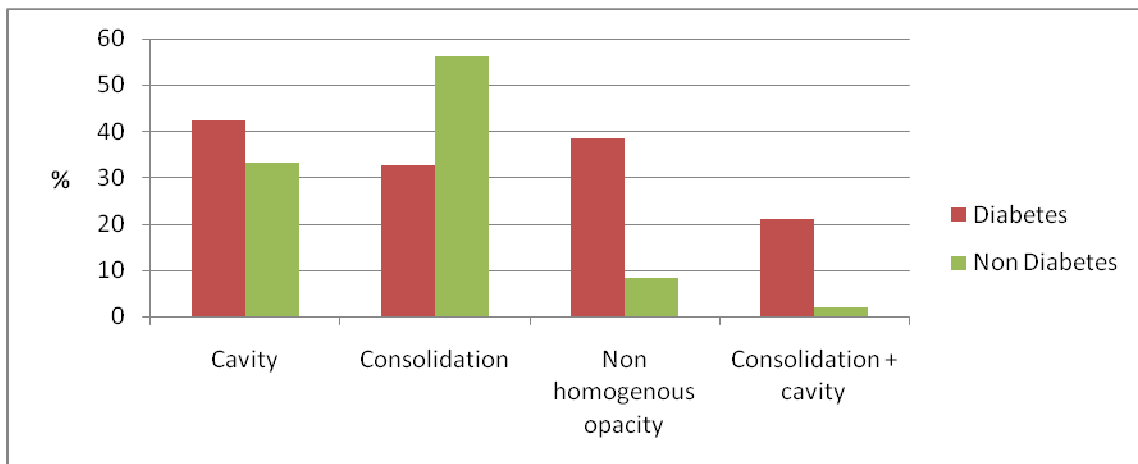
**Figure 3**  
**Comparison of side preference**



**TABLE 4.2**  
**Comparison of lesions**

| CHEST X RAY – TYPE OF LESION | DM (n= 52) | NON-DM(n=48) |
|------------------------------|------------|--------------|
| Cavity                       | 22 (42.3%) | 16 (33.3%)   |
| Consolidation                | 17 (32.6%) | 27 (56.2%)   |
| Non homogenous opacity       | 2(38.4%)   | 4(8.3%)      |
| Consolidation + cavity       | 11(21.1%)  | 1(2%)        |

**Figure 4**  
**Comparison of Radiological lesions**



**TABLE 4.3**  
**Comparison of zone preference**

| CHEST X RAY – ZONE       | DM (n= 52) | Non DM (n= 48) |
|--------------------------|------------|----------------|
| Upper Zone               | 10 (19.2%) | 29(60.4%)      |
| Middle Zone              | 12 (23%)   | 12 (25.0%)     |
| Lower Zone               | 12 (23%)   | 5 (10.4%)      |
| Upper & Mid Zone         | 6 (11.6%)  | 1(2.0%)        |
| Mid & Lower Zone         | 8 (15.4%)  | 0              |
| Upper + Mid + Lower Zone | 4(7.8%)    | 1(2.0%)        |

Table 4.1, 4.2, 4.3 compares radiological characteristics of diabetics and non-diabetics. Bilateral involvement or extensive disease was also more in the diabetic group than non-diabetics (38.5% vs 10.4%). Classical upper zone disease was more commonly seen in non-diabetics than diabetics (60.4% vs 19.2%). Lower zone involvement is predominant in diabetics compared to non-diabetics (46% vs 12.5%). Cavitation was also found to be more in diabetics than non- diabetics (63.4% vs 35.4%). All the above differences found in both groups were statistically significant.

## DISCUSSION

The relationship between Tuberculosis (PTB) and diabetes (DM) is old. Either diabetes is predisposing the reactivation of tuberculosis or diabetes may be caused by Tuberculosis due to insulin resistance. The diagnosis of PTB is confirmed either by sputum smear examination, culture for AFB or DNA probe. In minority of cases expectoration of sputum is less due to minimal disease or because of inability to cough out the sputum. In such cases we need to rely on good clinical history, clinical examination and radiological features. It has also been realized that particularly uncontrolled diabetes is more susceptible to the development of PTB.

### 1. Demographic characteristics

In our study, the average age of diabetics and non-diabetic tuberculous patients was 49.6±12.9 and 36.1±14.6 respectively. Similar findings were noted in most of the other studies. Desmukh et al<sup>3</sup> in his study reported that the majority(82.6%) of cases of tuberculous diabetics belongs to the age group of 45 years

& above. Brijkishore et al<sup>4</sup> observed that 57.1% of the patients were above the age of 40 yrs. Philips et al in their study noted that the relative incidence was highest in those who had passed 65 yrs. In both groups males were predominantly affected compared to females. Morris et al<sup>5</sup> & others also observed that male population outnumbered the females. Tripathy and Kar<sup>6</sup> reported that 78% of their patients were males.

### 2. Comparison of symptomatology

In our study, the most common presenting complaint in both the groups was cough with (or) without sputum. Haemoptysis was significantly higher in diabetics than non-diabetics. Jagdish Rawat et al<sup>7</sup> compared clinico-radiological pattern of pulmonary tuberculosis in young adults and elderly patients and found that hemoptysis (29.5% vs. 6%), fever (95.4% vs. 76%) and night sweats (54.5% vs. 18.0%) were significantly higher in the young adult patients than the elderly. Anand Patel et al<sup>8</sup> from Gujarat also reported that elderly patients had less incidence of fever, chest pain, haemoptysis and higher incidence of dyspnea as compared to young adults. Hariprasad et al<sup>9</sup> in his study found that the predominant clinical symptoms noted were anorexia (80%), cough (73%), and fever (56%) in patients of Tuberculosis with diabetes. Parvaneh et al<sup>10</sup> stated that there are no notable differences between the clinical presentation of PTB–DM patients and PTB cases without a history of DM with the exception of the greater incidence of Hemoptysis.

### 3. Comparison of Radiology

In our study bilateral involvement, cavitary lesions and lower zone predominance were more in Diabetics than non- diabetics. Similar

observations were reported in tuberculous diabetics by Hariprasad et al<sup>9</sup> and reported that lower lung field is involved more commonly in older age group than young adult patients. Jagdish Rawat et al<sup>7</sup> also reported a higher involvement of lower zone (24.0% vs. 7.9%) and far advanced lesions (32.0% vs. 14.7%) were seen in the elderly patients as compared to young adults. Hernandez et al<sup>11</sup> observed 48% patients affected with lower lung fields whereas Shaikh et al<sup>12</sup> and Jabbar et al<sup>13</sup> found 36% and 23.5% respectively. Shaikh et al<sup>12</sup> and Bacakoglu et al<sup>14</sup> found higher number of patients affected with cavitary lung involvement i.e. 50% and 59% respectively.

#### 4. Comparison of Bacteriology

In this study diabetics had a high bacillary load compared to non-diabetics (42% vs 4%). With the above findings along with higher prevalence of cavitary lesion(s) PTB-DM cases is

considered more contagious than those without DM.

## CONCLUSION

From the present study we conclude that, patients of diabetes developing Tuberculosis have atypical clinico-radiological features compared to non-diabetic tuberculous patients. Diabetics had more cavitary lesions and high bacillary load compared to non-diabetics increasing their infectiousness to the community. Now Diabetes being an established risk factor for TB, dissemination of knowledge of atypical presentation of Tuberculosis among Diabetics is important for early diagnosis of Tuberculosis and prevention of spread of the disease to the community.

## CONFLICT OF INTEREST

Conflict of interest declared none.

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