

# Concomitant Diabetes Mellitus and Tuberculosis as seen in Lagos, Nigeria

\* Odeniyi .I.A. \*\* Fasanmade. O.A \*\* Ogbera A.O., \* Department of Medicine, Lagos University Teaching Hospital  
\*\* Department of Medicine, College of Medicine, University of Lagos IDI Araba, Lagos.  
\*\*\* Department of Medicine, Lagos State University Teaching Hospital

Correspondence: Odeniyi .I.A.  
Endocrinology and Metabolism Unit, Dept. of Medicine Lagos University Teaching Hospital PMB 12003, IDI-Araba  
E-mail: ifeode@yahoo.com

## Abstract

### Background:

The frequency and enhanced severity of infection in uncontrolled diabetes were well known before and after the discovery of insulin. The association between tuberculosis and diabetes was noted more than a thousand years ago. The concomitant existence of these conditions has great implications on the management of either disease.

### Objective:

To describe the features of the coexistence of both conditions (diabetes and tuberculosis) in a cohort of patients seen in a Nigerian tertiary Health care delivery center.

### Material and Method:

Medical Records of patient with diabetes mellitus and tuberculosis seen at the Lagos University Teaching Hospital over a period of 3 years was entered into a standard pretested questionnaire and analyzed. Data analyzed included age, sex, duration of DM, anthropometric indices and drug therapy. Data were expressed as percentages.

### Result:

The salient findings were: the majority of cases were between 45-54 years, males predominated, and the duration of diabetes in majority was between one year and 10 years. Extrapulmonary TB is as rare as in the general non-diabetic population. In the chest, right upper lobe consolidation is the commonest lesion in patients with diabetes and tuberculosis while cavities are not a prominent feature.

### Conclusion :

Patients with diabetes mellitus are prone to developing tuberculosis. The longer the duration of the diabetes, the higher the tendency to developing tuberculosis and the higher its severity. There is male preponderance of concomitant disease.

**Key words:** diabetes mellitus, tuberculosis, cavities

## Introduction:

Chronic hyperglycemia due to absolute or relative insulin deficiency characterizes metabolic disturbances in persons with diabetes mellitus resulting in typical signs and symptoms. Insulin drives anabolic processes. Therefore in this disease weight loss and other nutritional changes are rife. The severity of microvascular and neurological complication is associated with severity and duration of hyperglycemia<sup>1</sup>. These complications contribute to the risk of infections<sup>2</sup>. Also the cellular and humoral immunity is known to be impaired by diabetes mellitus. The onset of pulmonary tuberculosis appears not more common in diabetics than in the general population<sup>1</sup>. Association between diabetes and tuberculosis has been reviewed by several workers & various incidences have been reported<sup>3, 4, 5, 6</sup>. It is however not certain if the immune impairment seen in diabetes mellitus affects the person's susceptibility to tuberculosis.

The present study is to determine the association between diabetes and tuberculosis in a tertiary health care setting and the effect of diabetes on the manner of presentation and the clinical course of pulmonary tuberculosis.

**Material and Method :** This study was a retrospective cross sectional study. Data from 30 patients confirmed to have both diabetes mellitus and tuberculosis over a period of 2002-2006 was analyzed. Information extracted from their records include, age, gender, type of diabetes, duration of diabetes, site of tuberculosis, chest x-ray findings, drug treatment for diabetes, and anthropometry.

## Results

### Age and sex incidence

Of the 30 cases, 23 (76.7%) were males and 7(23.3%) were female. Male: Female ratio of 3.3:1. The majority of the patients 10(33.3%) were between 45 and 54 years of age.

### Duration of Diabetes Mellitus:

Out of the 30 cases, 28 had either type I or type 2 diabetes mellitus, while 2 have no record of their type of diabetes. Of the 28, 1(3.3%) had type 1 diabetes mellitus, 27(90.0%) have type 2 diabetes mellitus. Duration of diabetes in 4 cases (13.3%) was not known due incomplete records. 17 (56.7%) had diabetes mellitus between 1 and 10 years before coming down with tuberculosis infection.

### Site of Tuberculosis Infection

Of the 30 cases, 27(90.0%) were found to have pulmonary tuberculosis, 1(3.3%) was found to have abdominal tuberculosis. Location of tuberculosis infection was not recorded in 2 patients. 21 of those with pulmonary tuberculosis were males and 6 were females.

**Drug Treatment:** Of the 30 cases, 13(43.3%) were treated with insulin prior to diagnosis of tuberculosis, 16(53.3%) were on oral hypoglycemic agents while 1(3.3%) were on no drug therapy.



### BMI and Diabetes

20 cases (66.6%) had a normal BMI, 5(16.7%) were underweight, 2(6.6%) were overweight while 2(6.6%) were mildly obese.

### Chest X-Ray Findings

Of the 30 cases, 15(50%) had their chest x-rays reported by the radiologist, 10(33.3%) of the patients had no chest x-ray done for reasons of financial constraints, chest x-ray records of 5(16.7%) could not be traced. 10(66.7%) cases had lesion on right lung field while 5(33.3%) cases had lesion on the left. The commonest lesion is consolidation with hilar lymphadenopathy. 3(20%) cases had cavitary lesions while 1(6.67%) case had right sided pleural effusion with tracheal deviation.

### Discussion

The age incidence of the cohort shows that majority of cases were between 45 and 54 years. There was a male preponderance and majority of the patients have had their diabetes for between 1 year to 10 years before developing tuberculosis. This is in keeping with previous findings that most patients develop tuberculosis after onset of diabetes and that the occurrence of pulmonary tuberculosis increased with duration of diabetes<sup>3</sup>. This will tend to lend credence to the well known susceptibility to infections that characterizes DM. Most of the patients had antidiabetic treatment instituted. Some were on insulin, some on oral agents while some were on diet. Effectiveness of oral drugs should be adequately assessed before the patient with tuberculosis and diabetes mellitus is allowed to continue with this option as the infection reduces insulin sensitivity and therefore worsens DM control. The probable reason for high association of tuberculosis and diabetes include: <sup>1,7</sup>

1. Hyperglycemia which favours the growth, viability and propagation of tubercle bacilli.
2. Disturbance in electrolyte balance and local tissue acidosis favors infection
3. Impaired phagocytosis and impaired cellular immunity in persons with diabetes allows for the spread of the disease over neutralizing antibodies in bronchial secretions.
4. Lower resistance due to vascular damage to lung tissue.
5. Disordered nutrition balance.

Thus uncontrolled diabetes may be indirectly responsible for the spread of tuberculosis infection.

We also observed that right upper lung field consolidation with hilar lymphadenopathy is the commonest lesion in the cases reviewed, while cavitary disease is not very common. Marias<sup>8</sup> observed lower lung field tuberculosis in 29% of patients with diabetes, as compared to 4.5% in the non-diabetic patients. However, in other studies<sup>9</sup>, cavitary disease and multi-lobe involvement was found to be more common in patients with pulmonary tuberculosis and diabetes.

**Conclusion:** The following can be concluded from this study: that the majority of cases occur in the middle age, there is male preponderance of concomitant disease and that the frequency of development of tuberculosis probably increases with duration of diabetes mellitus. Extrapulmonary TB is as rare as in the general non-diabetic population. In the chest, right upper lobe consolidation is the commonest lesion in patients with diabetes and tuberculosis while cavities are not a prominent feature. These peculiarities warrant larger, controlled studies in TB endemic regions.

#### **Recommendation :**

Diabetes should be controlled effectively by oral antidiabetic drugs failing which, insulin should be used. Regular screening for TB in poorly controlled DM patients is recommended.

#### **Acknowledgement:**

We acknowledge the assistance of the Medical Health Records Department of the Lagos University Teaching Hospital in obtaining patients' records.

#### **References**

1. Koziel H, Koziel MJ. Pulmonary complication of diabetes mellitus. *Infect Dis Clin North Am* 1995; 9:65-90.
2. Marvisi M, Bartolini L, del Borrello. Pulmonary function in Non-Insulin Dependent Diabetes Mellitus. *Respiration* 2001; 68:268-272.
3. Gupta A, Shah A. Tuberculosis and diabetes: An appraisal. *Ind. J. Tub* 2000; 47:3-8.
4. King H, Aubert RE, Herman WH. Global burden of diabetes 1995-2025: Prevalence, numerical estimates and projections. *Diabetes care* 1998; 21:1414.
5. Bashir M, Alcabes P, Rom WN. Increased incidence of multidrug resistant tuberculosis in diabetic patients on the Bellevue chest service, 1987 to 1997. *Chest* 2001; 120:1514-1519.
6. Perez-Guzman C, Torres-Cruz A, Villarreal-Verlarde H. Atypical radiological images of pulmonary tuberculosis in 192 diabetic patients: a comparative study. *Int J Tuberc Lung Dis* 2001; 5:455-461.
7. Schneider E. Tuberculosis among American-Indians and Alaska natives in the United States of America, 1993-2002. *Am J Public Health* 2005; 95(5):873-880.
8. Marias RM. Diabetes mellitus in black and coloured tuberculosis patients. *South Afr Med J* 1980; 57: 483.
9. Umut S, Tosun GA, Yildirim N. Radiographic location of pulmonary tuberculosis in diabetic patients. *Chest* 1994; 106: 326.



Sex distribution

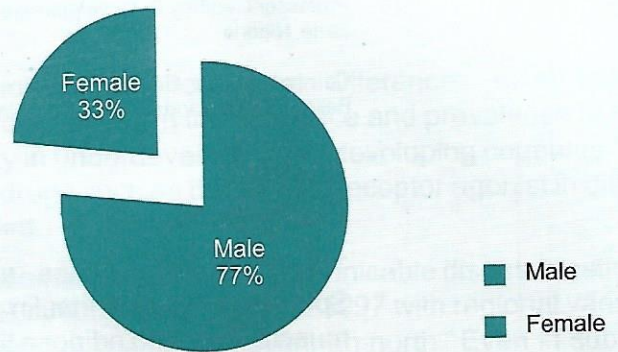


Figure 1: Sex distribution

Distribution of diagnosis

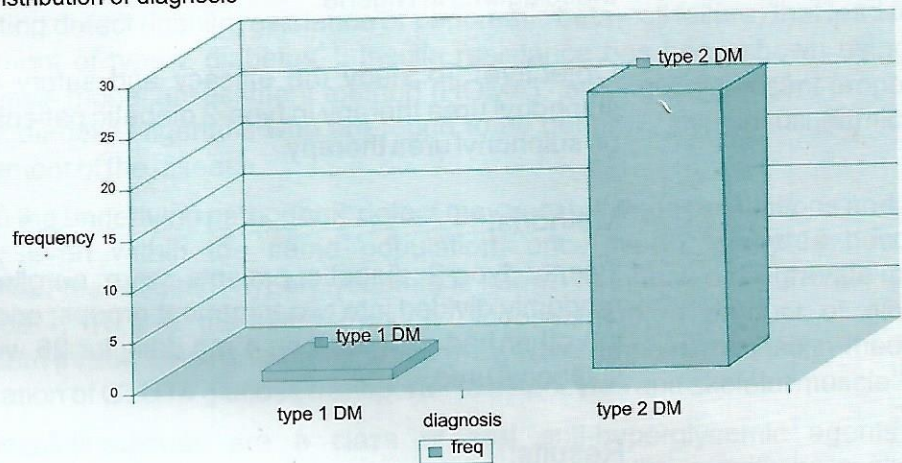


Figure 2: Distribution of diagnosis

Site of tuberculosis infection

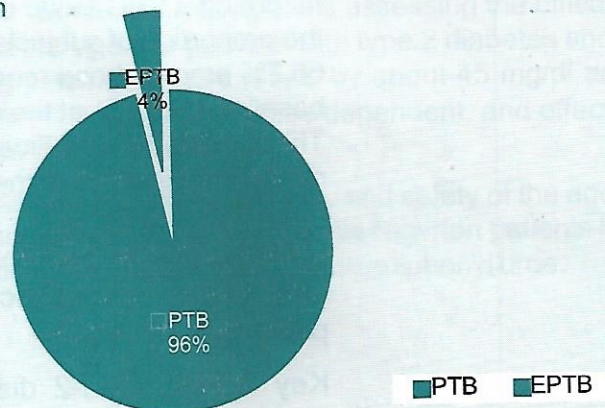


Figure 3: Site of tuberculosis infection