



## Prevalence of Diabetes Mellitus in tuberculosis patients at DOTS regional centre KMU-IMS teaching Hospital Kohat

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### Abstract:

Recently several publications have been pronounced the relationship among Diabetes mellitus and tuberculosis patients, certainly the rise in the frequency of dynamic Diabetes mellitus in patients with tuberculosis and due to minor cure leading in Diabetes mellitus patients compared to those having no diabetic disorder. This research study was accompanied in the outpatient clinic shortened directly observed therapy (DOTS) center Kohat. Diabetes mellitus

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*individualls were arbitrarily selected by simple random sampling technique, the history and risk factors were collected through consent Questionnaire and blood samples were collected by nurse and were tested for glucose with hand-held glucometer. The level of random blood glucose of diabetes Mellitus were of level of 200 or > 200 mg / dl with signs of high thirst, polyurea, weight loss, fatigue, weakness and blurred vision. In this study the HIV positive patients were excluded. The total no of patients which were included in the study were two hundred and fifty three (253), out of which 112 (44.26%) were males and 141 (55.73%) were females. Among 253 patients 48 (18.97%) patients were having blood glucose levels more than 200mg/dl, 65 (25.69%) patients were having blood glucose levels between 150-200 mg/dl, whereas 140(55.33%) were having blood glucose level below 150 mg/dl. The incidence of diabetes mellitus was increased in tuberculosis patients which can affect curing consequences. The finding of Diabetes Mellitus in tuberculosis patients was based on very simple test that can advance database presentation. The aim of this study was to find the prevalence of diabetes mellitus and pre-diabetes amongst a group of Tuberculosis patients listed in selected Tuberculosis Units (TUs) of National Tuberculosis Control Program (NTCP) in KMU-IMS teaching Hospital Kohat KhyberPakhtoonkhwa, Pakistan and recognize the pattern of diabetes organization availed by the known diabetes cases.*

**Key words:** Diabetes Mellitus; Tuberculosis; DOTS

## **Introduction:**

Diabetes Mellitus is a metabolic disease that declines the immune system of Human being. The incidence and greater sternness of infections in uninhibited diabetes were well known before and after the discovery of insulin. The accessibility of antibiotics has made an excessive difference, but infection is maybe a more serious threat to life in a diabetic than in the non-diabetic. DM is a eminent risk factor for TB in the past<sup>1, 2</sup>.

Globally there is rise in cases of type 2 DM and greatest increase in cases will occur in developing countries, where TB is highly widespread<sup>3</sup>.

The universal burden of diabetes mellitus (DM) and tuberculosis (TB) is enormous. Nearly one-third of world's population is infested with Mycobacterium tuberculosis and about 10% of them are at risk of rising active form of the disease in their lifetime depending upon the interaction of the epidemiological triangle<sup>4, 5</sup>. Screening for Diabetes Mellitus in Tuberculosis patients might develop Diabetes Mellitus case detection and early treatment and indirectly lead to better TB specific treatment consequences<sup>6</sup>. Many research questions about connotation between diabetes and TB remain unrequited because of lack of well-made studies<sup>7</sup>. Tuberculosis is at least as old as manhood and mycobacteria are assumed to be amongst the oldest bacteria on earth. Tuberculosis infection causes almost 6% of mortality globally<sup>8</sup>. According to conventional estimations about 2 million new cases of tuberculosis are perceived each year. The entire number of cases of tuberculosis in the world are located at 15-20 million. The disease is on the increase and existing statistics with WHO show that annual frequency of tuberculosis may reach 300 per 100,000 populations in parts of Asia<sup>9</sup>. Diabetic patients have an increased tendency to get infection particularly of tuberculosis and fungus. Their incidence is stated to be four times greater than in non-diabetic patients<sup>10</sup>. The frequency of pulmonary tuberculosis in another study was 10 times greater among diabetic patients<sup>11</sup>. Diabetics the frequency of diabetes has been shown to increase in the developing countries as they are being westernised<sup>12</sup>. The assessed incidence of diabetes mellitus in Pakistan is 8%. There are at current at least 10 million diabetics in the world<sup>13</sup>. Diabetes is a risk factor for emerging active TB. There is strong indication for this relationship, with studies examining the occurrence of TB viewing it to be two to

five times greater in diabetic patients than in non-diabetic patients<sup>14, 15</sup>. In 2011, the International Diabetes Federation (IDF) assessed that around 366 million individuals globally have diabetes mellitus (DM). 80% of these individuals live in the low and middle income countries where tuberculosis (TB) is greatly predominant<sup>16</sup>. Tuberculosis (TB) is an infective disease which is caused or produced by different strains of mycobacteria, particularly *Mycobacterium tuberculosis* and *Mycobacterium Bovis* generally attacks the lung<sup>17</sup>. It remains to be a main cause of disease and death throughout the world. It is assessed that one-third of the domain's people is infected, 8.8 million people develop TB, and 1.45 million people die yearly from the disease<sup>18</sup>. This study was conducted to define the prevalence of diabetes and pre-diabetes amongst a group of TB patients listed in selected Tuberculosis Units (TUs) of National Tuberculosis Control Program (NTCP) in KMU-IMS Teaching Hospital Kohat KhyberPakhtoonkhwa, and recognize the pattern of diabetes organization availed by the known diabetes cases.

## **Methodology**

This descriptive study was conducted in the outpatient clinic of the directly observed therapy short course (DOTS) for tuberculosis Khyber Medical University Institute of Medical Sciences Teaching Hospital Kohat. Total of 194 patients were selected randomly, with the sign and symptoms of TB as per informed consent from the subject Blood was tested for glucose with glucometer after explaining the purpose of the study Diabetes Mellitus was defined as a random blood glucose of 200 or > 200 mg / dl with symptoms of increased thirst, polyuria weight loss, weakness, fatigue and confusion vision.<sup>19</sup> human immunodeficiency virus (HIV) positives patients were excluded from the study.

The DOTS center of the hospital works under the National TB Control. The control program of tuberculosis using the WHO Directly Observed Treatment, Short Course DOTS strategy. The patients were referred by physicians from the center of the DOTS strategy, in addition to those who directly presented. Patients were diagnosed on clinical presentations such as cough, fever, household contact and radiological findings. Three consecutive days of sputum for Acid Fast Bacilli projected (AFB) by Ziehl-Neelsen staining.

Cases of extra-pulmonary tuberculosis negative sputum were diagnosed on ascetic / pleural fluid cytology and biochemical analysis, radiography, histopathological examination of the lymph nodes and the response to anti-tuberculosis therapy (ATT) <sup>20</sup>.

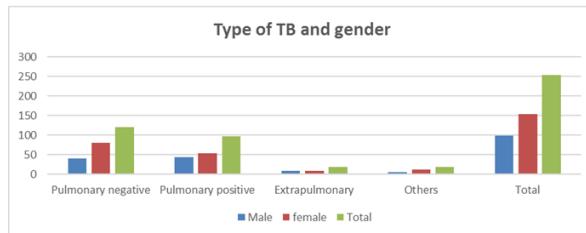
### **Statistical Analysis:**

Data were analyzed using SPSS version 14 Mean and standard deviation were calculated for numeric variables as frequencies and percentages were calculated for categorical variables.

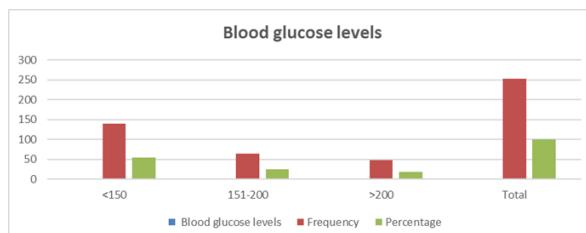
## **Results**

The total no of patients which were included in the study were two hundred and fifty three (253), out of which 112 (44.26%) were males and 141 (55.73%) were females. Among 253 patients 48 (18.97%) patients were having blood glucose levels more than 200mg/dl, 65 (25.69%) patients were having blood glucose levels between 150-200 mg/dl, whereas 140(55.33%) were having blood glucose level below 150 mg/dl.

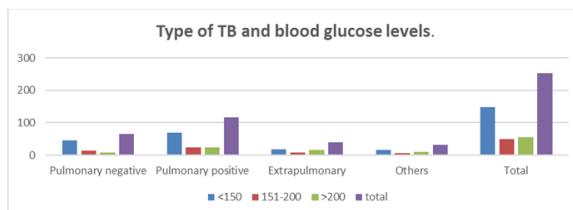
**Graph 1. Type of TB and gender**



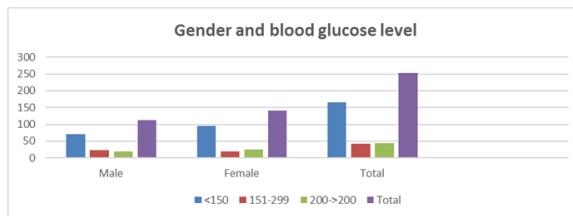
**Graph 2. Blood glucose levels**



**Graph 3. Type of TB and blood glucose levels.**



**Graph 4. Gender and blood glucose level**



## **Discussion:**

This is the first cross sectional study of Khyber Pakhtunkhwa (KPK) which was conducted in the directly observed treatment short courses DOTS program routine for the detection of diabetes. Shera et al concluded 11.6% of Diabetes in third survey in KhyberPakhtoonkhwa. He concluded in his two survey that the prevalence of type 2 Diabetes mellitus in adults ( $> 25$  years) was 13.9% in Sindh and 8.6% in Baluchistan<sup>21,22</sup>. In our study the prevalence rate of diabetes was 18.97% which is greater than the general population without tuberculosis, and our study show similarity with Alisjahbana<sup>23</sup> Indonesia, which concluded the prevalence percentage of 13.2%. Li Liang in china concluded prevalence of 12.4% .<sup>24</sup>The prevalence in our study is less than Restrepo et al<sup>25</sup> in the United States, he concluded 27.8% Diabetes mellitus type 2 led them to explore the association between Diabetes mellitus and Tuberculosis in South Texas-Mexico. We have not combined self-reported diabetes in our study that could have resulted in reducing the occurrence of screening for diabetes in well-controlled diabetics. The major complications with the screening method, which took place shortly after the process of anti-Tuberculosis a treatment, is that Tuberculosis may induce infection-related hyperglycemia. In other studies evaluating blood glucose levels at various points during the course of anti-TB treatment, the prevalence of hyperglycemia decreased over time<sup>26, 27</sup>. Of the total of 55 diabetic patients, 12.72% were having negative sputum TB where as 41.81% diabetes suffered from sputum positive tuberculosis, which is a problem of great worry. Restrepo et al in the United States concluded that patients having diabetes and tuberculosis were more positive smears at diagnosis, and remain positive at the end of the first (Texas) or second (Mexico) months of treatment<sup>28</sup>.Our study is similar to the study in united states<sup>21</sup>.This may be related to the fact that

type 2 DM is more frequent in the older group. In both Korean and Japanese<sup>29,30</sup> studies, the prevalence was highest in the age group 40-50 years compared with other age groups, which is almost the same in our study. In the Indian study most patients were over 40 years old<sup>31</sup>. The strength of this study is to be carried out with routine structure and does not need much expensive and extra hard work. Single puncture was used for HIV-Ab test and RBG. Limitations of this study are that self-reported Diabetes Mellitus Performa did not apply FBG was not done and HbA1c (glycosylated hemoglobin), was not performed which could have provided an index of hyperglycemia during a period of time and have overcome the problem of having infection induces hyperglycemia. However, the results of this preliminary study will help in incorporating the detection of TB patients for diabetes in the DOTS program to better treatment outcomes.

## **Conclusion**

The prevalence of diabetes is higher in tuberculosis, which can affect treatment outcomes. The detection of DM is based on very simple test that can improve program performance.

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