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Diabetes-related tuberculosis strains from PIMS Hospital Islamabad pulmonology department qualitative, cross-sectional, and observational study

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***Abstract*---**Background: Tuberculosis is one of the most common infectious diseases that patients with DM get because of their weakened immune systems. Objective: The purpose of this study was to identify the prevalence of different types of active tuberculosis among individuals with diabetes. Methodology: The Department of Pulmonology at PIMS Hospital Islamabad, which was done from January 2021 to January 2022, employed cross-sectional, observational, and qualitative techniques studied in this inquiry. Inquiries were conducted in pulmonology department outpatient clinics with patients with diabetes who satisfied the inclusion criteria (cough with or without expectoration, hemoptysis, persistent fever, and unexplained weight loss) (OPDs). All instances of immunological compensation and secondary diabetes, as well as short duration of diabetes, age less than 10 and more than 85, were disregarded. After approval was gained, a comprehensive history, clinical examination,

and testing were carried out to investigate the potential of TB. SPSS version 26 was used to import all the data for further analysis. Of of the 545 patients that were questioned, 149 were selected for further TB testing. Just 18 people had active TB, according to the data (12 per cent). The male to female ratio was 01.07:02.02, the mean number of years with diabetes was 11.03, and the mean age was 51.02 11.02. Everyone had type 02 diabetes, with the exception of one who had type 01 diabetes. 53% of all tuberculosis cases were found to be pulmonary cases, and 46% were found to be extrapulmonary cases. The rates of pulmonary cancer were 12% for main cases, 17% for secondary cases, and 06% for milliary cases. Multidrug-resistant tuberculosis was found in 22% of patients, which is almost twice as common as instances of non-diabetic cases, and smear positive was found in 58% of patients. Results: As a consequence, 149 individuals were selected for further TB testing, and 545 patients were interrogated. Just 18 people had active TB, according to the data (12 per cent). The male to female ratio was 01.08:01.04, the mean number of years with diabetes was 10.04, and the mean age was 51.02 11.01. Everyone had type 2 diabetes, with the exception of one who had type 01 diabetes. 55% of all tuberculosis cases were found to be pulmonary cases, and 46% were found to be extrapulmonary cases. The rates of pulmonary cancer were 12% for main cases, 17% for secondary cases, and 06% for milliary cases. Multidrug-resistant tuberculosis was found in 20% of patients, which is almost twice as common as instances of non-diabetic cases, and smear positive was found in 58% of patients. Conclusion: Diabetes patients have higher rates of tuberculosis than the overall population. Those with diabetes are more likely than those without it to develop extrapulmonary tuberculosis. In order to prevent the development of MDR-TB and the emergence of a serious public health concern in this poor country, diabetics should undergo more frequent disease screenings.

***Keywords*---**diabetes, pulmonary, extrapulmonary tuberculosis, variations, drug-resistant, tuberculosis matters.

Introduction

Diabetes is referred regarded as the "traditional mother of all diseases"1. This is caused in part by the fact that immunomodulation patients have a higher TB infection rate than the general population. Diabetes is becoming more common everywhere. Those with diabetes are more likely to get the fatal illness of TB due to their weakened immune systems2. Pakistan is ranked #8 in terms of sickness prevalence by the World Health Organization, with an estimated 09.07% of the urban and rural population suffering from an illness3.

Table 1: 10 individuals with 10 different pulmonary TB strains (54%)

(S.No)	[Part of the lung involved]	[No of patients]	[Smear +]
01	[Unilateral apical]	02	[01]
02	[Bilateral apical]	0	[01]
03	[Unilateral apical]	02	[01]
04	[Unilateral upper lobe consolidated]	0	[01]
05	[Unilateral middle lobe consolidated]	03	[Nil]
06	[Unilateral middle lobe]	0	[01]
07	[Unilateral pleural effusion]	02	[Nil]
08	[Cavitating mass]	02	[01]

There is the evidence between diabetes with TB. Sufferers of Tuberculosis have been hypothesised to be at an increased risk of developing diabetes mellitus[4]. There are now around [01.04] million TB patients in Pakistan, with an additional [0.24] million developing the illness each year. Studies and polls show that the rate at which people with diabetes in Pakistan get Tuberculosis is much higher than the global average [14-19%]. This Study aimed to examine the prevalence of diabetes and Tuberculosis in South Africa and to compare the prevalence of diabetes and Tuberculosis in the general population. Chronic cough, weight loss, and extended fever as a result of diabetes supported by biochemical/microbiological/serological data were accepted as inclusion criteria for patients aged 11-85 with diabetes of more than 06 years duration[5,6]. To analyse the different variants of Tuberculosis in diabetic populations of Karachi, Pakistan, we excluded patients with secondary diabetes, those taking steroids or immunosuppressants, those with polyglandular autoimmune diseases, and those with a history of H/O tuberculosis who had undergone complete ATT[7].

Methodology

This Study was performed in the wards, OPDs, and the chest OPD at The Department Of Pulmonology At PIMS Islamabad from jan 2021 to jan 2022 using a random sample of patients between January 2021 and Jan 2022. The treating doctors used the inclusion criteria to select the patients. Consent was obtained orally, a complete medical history was recorded, and a comprehensive physical examination was performed, all of which yielded positive results. Blood CBC with ESR, HbA1C, FBS, and sputum for three samples for DR/AFB, X-ray Chest PA view, and sputum for DR/AFB was the minimum recommended studies. SPSS version 24 was used to input all the data for statistical analysis. Patients who tested positive for Tuberculosis were asked about their diabetes management and when they first noticed symptoms. They were also categorized according to the location and kind of their infection.

Results

Only 149 out of 545 diabetic patients who presented at PIMS outpatient clinics met the study's inclusion criteria. The patients' median and mean ages were both 51 years old. The Number of men to women was 0.08 to 1. In particular, smoking and gutka use accounted for at least 58% of their addiction rates. The average time spent by people with diabetes was 12.0405.11. Only three individuals had an

HbA1c of less than 6%, so uncontrolled diabetes was common. The average HbA1c was 7.35% 0.97. One teen (19%) of the 149 individuals was diagnosed with active TB. These individuals' diabetes had been going on for a long time, as seen by the high mean HbA1c (above 6%). Eleven (57.5%) of the patients tested positive for TB on a sputum smear, whereas nine (44.5%) tested negative. There were 13 cases of pulmonary TB (59%) and 8 cases of extrapulmonary TB (40%). Table 01 displays the various pulmonary TB variations, whereas table 02 displays the many extrapulmonary tuberculosis subtypes. The various clinical presentations of TB are summarised in [Table No. 03]. Forty-nine per cent of diabetics had a BCG vaccination record.

Discussion

The traditional medical adage goes like this, "Diabetes is the mother of all ailments[8]." Because of immunomodulation and other variables, Tuberculosis is one of the most prevalent infectious diseases acquired by the diabetic population[9]. There is a linear association between the spread of Mycobacterium tuberculosis and the rise in the prevalence of type 2 diabetes across the world. This study's finding of an incidence of 13% is significant compared to the general population's (0.3% in 2019), and it corroborates the findings of a 2019 review paper by Workneh and colleagues that identified an incidence of 15% of diabetic TB in Pakistan[10]. Because of this growth in

Table 02: Extra pulmonary TB strains [N = 08]

[S. No]	[Extra-pulmonary site]	[Number of patients]	[Smear +]
[01]	[Military / Disseminated]	02	02
[02]	[Intestinal]	04	01
[03]	[Lymph nodes cervical]	02	Nil
[04]	[Kidneys renal]	01	Nil
[05]	[Skin]	01	Nil
[06]	[Meninges]	02	Nil

the rise in new cases, poor care, lack of follow-up, self-medication, avoidance behaviours, unhealthy lifestyles, lack of hygiene practices, and the use of steroids in diabetic asthmatics are all contributing factors. In this investigation, TB was most prevalent in the mediastinum, lymph nodes, and vertebrae, and in the kidneys, blood, and nervous system (meninges and adrenals) last. They are 16 years old and chronic public spitting offenders[11]. One More This Study indicated that a high incidence of addiction and a lack of BCG immunisation were major risk factors for smear-positive TB among people with diabetes. Several investigations, including one by Aliya Siddiqui in 2012, provide strong evidence for these criteria. The Study by Baghoei P et al. from 2015 confirms that non-adherence to medication and greater HbA1c are significant risk factors[13]. Only one participant had type 1 diabetes, and another had diabetes as an accidental finding in meningeal TB. Most (56%) of TB cases were found to be pulmonary TB; however, in previous Study, this was only the case in 7-10% of nondiabetic participants. This Study indicated that among people with diabetes, multidrug-resistant Tuberculosis occurred at a rate of 21%, whereas among nondiabetics, it occurred at a rate of 12%. In this Study, 51% of participants were vaccinated with

BCG and 51% were not inoculated since EPI did not begin its immunisation campaign until after [1971] [14]. People born before this time were not vaccinated, making them more susceptible to disease transmission. The rate was just 53.8%, while it was 68% in the nondiabetic group. Shown by a plethora of Study efforts. It's the most frequent co-population; on the other hand, extrapulmonary TB among people with diabetes was 41.2% compared to 33% in nondiabetics. As a result, nondiabetic people are more likely to develop pulmonary TB, whereas people with diabetes are more likely to develop extrapulmonary TB[15]. Almost identical to nondiabetics, those with diabetes are more likely to develop pulmonary TB in the upper and apical lobes. The most common location for extrapulmonary Tuberculosis is the intestines. The Study identified hypertension, ischaemic heart disease, bronchial asthma, COPD, nephropathy, and neuropathy as morbidities. Several studies have shown a correlation between these issues and having diabetes mellitus, having the condition for a longer period, and leading a less active lifestyle. 21 More Study is needed to determine if these co-occurring conditions affect the prevalence of diabetes and tuberculosis[16].

Table 03: Overall care TB kinds among people with diabetes (N= 18)

[S. No]	[Type of TB]	[Number of patients]	[Smear +]
[01]	[Primary TB]	03 [11%]	02
[02]	[Post-primary TB]	01 [19%]	02
[03]	[Reactivation TB]	02 [07%]	02
[04]	[Extra-pulmonary TB]	07 [41%]	01
[05]	[MDR-TB]	03 [22%]	03
[06]	[Milliary TB]	02 [06%]	02

Conclusion

The hypothesised result of this study agrees with prior experience. As a result, it must be right. Diabetes patients have a substantially greater incidence of tuberculosis, particularly extrapulmonary tuberculosis, than nondiabetic populations. Diabetes patients Secondary tuberculosis often affects the upper and apical lobes after the first stage. Extrapulmonary Tuberculosis is more often seen in the intestine. MDR-TB is fairly common among diabetics, and if substantial efforts are not taken promptly and rapidly, this will become a major public health problem in the future.

Authors' contributions

Zia ul haq: Literature Review, manuscript drafting.
Qasim Nawaz: Data collection & statistical analysis
Jehangir khan: Data Interpretation
Muhammad israr: Proof reading
Inam Khan: Manuscript drafting,
Madiha Nawaz: Expert opinion and manuscript revision**.**

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