

Prevalence of Asymptomatic Pulmonary Tuberculosis in Diabetics Patients in District Bannu and Adjacent Areas

Asymptomatic
Pulmonary
Tuberculosis in
Diabetics

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ABSTRACT

Objective: This study aimed to determine the Prevalence of Asymptomatic Pulmonary Tuberculosis in Diabetic patients in District Bannu and adjacent areas.

Study Design: Descriptive, case series study.

Place and Duration of Study: This study was conducted at the DHQ Teaching Hospital (DHDTH) in Bannu, Khyber Pakhtunkhwa from January 2022 to July 2022.

Methods: Data were collected from 100 patients who had Diabetes (either Type 1 or 2) for 5 or more years, presented to medical OPD or admitted in Medical Ward, with no respiratory symptoms, but having only mild undiagnosed fever for more than 2 weeks.

Results: Out of 100 patients, 41 were males (41%) and 59 (59%) were females. All of these were having Diabetes (19 having Type 1 and 81 Type 2) for 5 or more years. They had mild fever for more than 2 weeks, which was not yet diagnosed. None of them were having respiratory symptoms like cough, sputum, pleuritic chest pain, hemoptysis or noisy chest. Out of these, all 100 patients (100%) were having uncontrolled Diabetes (RBS>200mg/dl, FBS>126mg/dl, HbA1C% >7.5%) and mild Fever (>100.0F) for >2weeks.

They all were advised chest x-ray for screening of pulmonary tuberculosis, 23 came out to have pulmonary tuberculosis, based on radiological diagnosis. Later on, the same were confirmed either bacteriologically or through HRCT (High Resolution CT thorax).

Conclusion: In our set up, Tuberculosis (both pulmonary and extra/pulmonary) is chronic and endemic, having a diverse clinical presentations. In diabetic patients, it is even more common, and asymptomatic with no respiratory symptoms having only mild undiagnosed fever for more than 2 weeks, and remains undiagnosed on routine examination. Thus, all diabetic patients must have a screening chest X-ray, when they have prolong fever for >2weeks, even though they do not have any respiratory symptoms. For early diagnosis and treatment to reduce the illness burden, infectivity, transmission, and consequences, a physician must maintain high suspicion and alertness.

Key Words: Asymptomatic Pulmonary tuberculosis, Diabetes Mellites, District Bannu.

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INTRODUCTION

One infectious disease that can be spread from person to person is tuberculosis (TB), which is caused by the bacterium *Mycobacterium Tuberculosis* (MTB). Tuberculosis transmission typically occurs when an infected person coughs, sneezes, spittles, or speaks to others in close proximity for an extended period.

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On a global scale, tuberculosis is one of the top ten leading causes of death, and it poses a significant public health concern, especially in poorer nations. It is the second most lethal infectious disease after HIV/AIDS^{1,2}. Over 60% of the world's tuberculosis cases occur in developing nations, where resources like diagnostic testing and treatment are scarce owing to economic hardship. These nations include China, Nigeria, Indonesia, Pakistan, the Philippines, and Pakistan. three, four. Tuberculosis poses a significant threat to public health in Pakistan. Nearly 70,000 individuals lose their lives each year as a result of tuberculosis (TB)⁵. Half a million new cases are recorded annually. Pakistan is ranked fifth globally for tuberculosis (TB) cases, mainly because of the high prevalence of multi-drug-resistant tuberculosis (MDR-TB)^{3,6,7}. On an annual basis, about 55,000 new cases of tuberculosis (TB) are reported in Pakistan's Khyber Pakhtunkhwa province⁵. The province of Khyber Pakhtunkhwa had around 462,920 tuberculosis cases between 2002 and 2017.

TB is also more common and endemic in District Bannu. According to one study, "Prevalence of pulmonary tuberculosis in the District Bannu, Khyber Pakhtunkhwa, Pakistan"⁸, the number of positive cases of the disease were 17.85% of patients enrolled for diagnosis, 57.14% were females, and 42.86% were males, slightly more in females. This increase prevalence here is because of many factors like poverty, illiteracy, unawareness, joint family system, overcrowding, poor sanitation, and unhealthy dietary habits. Different TB Control Programs like The Revised National Tuberculosis Control Programme (RNTCP) and Provincial TB Control Program (PTBCP) KPK exist.

One of the leading causes of death among people worldwide is diabetes mellitus (DM). There are two forms: Type 1, which manifests in early life or childhood, and Type 2, which manifests in adulthood or later in life⁹. Both the patient and the nation's economy bear the emotional and financial costs of this disease, which is becoming more common and associated with complications and mortality. Type 2 diabetes mellitus affects 90% of the 463 million persons diagnosed with diabetes globally¹⁰. After China and India, Pakistan has the third-highest diabetes prevalence rate globally¹¹. In 2016, 11.77% of Pakistanis had diabetes, in 2018 it was 16.98%, and in 2019 it was 17.1%. In 2022, there would be over 33,000,000 cases of diabetes in Pakistan, which is 26.7% of the adult population, according to the International Diabetes Federation. This figure is extremely high and is getting worse every year. Pakistan is more susceptible to diabetes-related mortality due to illnesses like tuberculosis because of its higher incidence. The average male prevalence of type 2 DM in Khyber Pakhtunkhwa (KPK) is 9.2% and the female prevalence is 11.60%. Both diabetes and tuberculosis take a high toll on Pakistan. In our community and among at-risk populations, such as diabetes patients, tuberculosis is more prevalent, often causes no symptoms, and can spread both within and outside the body. One of the main causes of death and disability is tuberculosis. It is a top priority because it is a communicable disease that millions of people are at risk from. In our setting, there is a lack of local data on diabetic individuals with radiologically diagnosed asymptomatic pulmonary tuberculosis. In the future, this randomised trial can be expanded to a bigger scale. Even asymptomatic tuberculosis can develop in diabetic persons residing in highly endemic areas of the disease. Treatable tuberculosis is also avoidable. Many instances go unrecognised because of the difficulties in preventing and treating the disease in these endemic regions, which are caused by factors such as poverty, terrorism, military activities, and other social and economic instability. Accordingly, early tuberculosis detection and treatment in our setup and the surrounding FATA areas are inadequate in Khyber

Pakhtunkhwa. Accordingly, the purpose of this research was to document cases of asymptomatic pulmonary tuberculosis among our community's diabetes individuals.

METHODS

Department of Medicine, DHQ Teaching Hospital Bannu KPK, from Jan 2022 to Jul 2022.

Sample Size: 100 patients, all having Diabetes (either type 1 or type 2 DM) for 5 or more years ,having no respiratory symptoms, having only mild undiagnosed fever for more than 2 weeks.

Sampling Technique: Consecutive, Non-probability Sampling.

Inclusion Criteria: All those Diabetic patients (both type 1 and type 2), having diabetes for 5 or more years, having no respiratory symptoms, complaining of mild undiagnosed fever, of more than 2 weeks, have no previous chest x-ray, of Either gender, aged above 14 and under 60 years.

Exclusion Criteria: This study did not include patients who did not meet the inclusion criteria, had a positive family history of tuberculosis (TB) or tuberculosis (TB) contact, had received treatment for pulmonary tuberculosis (TB), were terminally ill, refused to participate, or were mentally retarded. This was due to the fact that these patients had either received treatment previously, would not benefit from the planned treatment in the future, or would introduce recall bias into the study. They would bring bias into the study outcomes if they were included as confounders.

Data Collecting Procedure: Obtaining approval from the hospital's ethics and research committee or board allowed the study to proceed. We included in the study all patients who met the inclusion criteria according to the operational definitions and who came to the emergency room or outpatient department of DHQ Teaching Hospital Bannu to see a doctor. Before interviewing any patient, they were all counselled. All patients were given a thorough explanation of the study's goals and methods, and those who were interested in participating were asked to sign an informed consent form. All patients had a comprehensive medical history that included information about their diabetes, its length, and any patterns in their fevers and chest pains. After that, the study population's temperature and chest were taken. The hospital lab tested these patients for glycemic control and diabetes using random blood sugar and haemoglobin A1C% levels, and they also had a screening chest X-ray to rule out undiagnosed asymptomatic pulmonary tuberculosis. The results were recorded on a flow sheet that contained all the relevant data.

Radiologically diagnosed pulmonary tuberculosis (TB) was used to classify all patients into two groups: those with TB and those without. Typical x-ray findings of

TB in the lungs include apical involvement with penetration, cavitary lesion, bilateral Hillar lymphadenopathy, bilaterally pulmonary infiltrates/cross sign, and apical brochiectasis. Using the pre-designed Proforma, we recorded every piece of information, including names, ages, genders, addresses, disease patterns, symptoms, signs, and test values. The analysis was limited to a full Proforma. Rigorous exclusion criteria were implemented to ensure that the study's results were free of bias and confounding variables.

Statistical Analysis: The collected data was processed using descriptive statistics in SPSS version 23. The mean plus standard deviation were computed for numerical/quantitative data such as age. Qualitative variables, including gender, disease type (1 or 2 DM), and x-ray presentations, were quantified using frequencies and percentages (%). To identify the factors that moderated the effects, they were stratified by gender and age. Tables were utilised for the presentation of all results.

RESULTS

Entire study participants were 100 individuals with a history of diabetes mellitus (type 1 or type 2) spanning over 5 years. There were 59 female patients and 41 male patients out of 100 total, for a male to female ratio of 1.0 to 1.44 (see Table 1).The participants' ages varied from fifteen to sixty-five, with a mean of forty-one years and seven months (± 11.707 years) (TABLE :2).Out of a total of 79 patients, 33 were male and 46 were female, and all were suffering from type 2 diabetes mellitus (a total of 21 individuals, 8 men and 13 females represented this 21%).

All were having undiagnosed low grade fever for more than 2 weeks, but non were having typical respiratory symptoms of pulmonary TB.

When they were screened for asymptomatic pulmonary TB through chest X-Ray, then total 23 diabetic patients (23%) (8 in type 1 DM, 3 males and 5 females, while 15 in type 2 DM, 7 males, 8 females) came out to have a chest X-ray suggestive of pulmonary TB (TABLE 3). They were labeled as radiologically diagnosed asymptomatic pulmonary TB. Over all, it is slightly more in females and in type 1 DM. Later on, they were confirmed either bacteriologically or through HRCT.

Summarized Descriptive statistics of the study population are shown in tables and charts.

Table No.1: Age and Gender Distribution of the study population (n=100)

		Gender		Total
		Male	Female	
Age	<25years	7	10	17
	25-45 years	19	32	51
	>45 years	15	17	32
Total		41	59	100

Table No. 2: Pulmonary Tuberculosis distribution in Diabetic patients, Type wise and Gender wise (n=100)

			Radiological Pul TB	No Radiological Pul TB	
Male	Diabetes	Type 1 DM	3	5	8
		Type 2 DM	7	26	33
Total			10	31	41
Female	Diabetes	Type 1 DM	5	8	13
		Type 2 DM	8	38	46
Total			13	45	59
Total	Diabetes	Type 1 DM	8	13	21
		Type 2 DM	15	64	79
Total			23	77	100

DISCUSSION

A total of 100 patients with diagnosed diabetes millites (both type 1 and 2) for more than 5 years were included in the study. Out of these 100 patients, 41 patients were males (41%) and 59 (59%) were females, with M/F ratio of 1.0 : 1.44. Their age ranged between 15 and 60 years, and the mean age was $40.19.78 \pm 11.707$ years (TABLE 1).

All of these were having either type 1 DM (21%) (total 21 patients, 8 males and 13 females), or type 2 DM (79%) (total 79 patients, 33 males and 46 females).

All were having undiagnosed low grade fever for more than 2 weeks, but non were having typical chest/respiratory symptoms of pulmonary TB.

When they were screened for asymptomatic pulmonary TB through chest X-Ray, then total 23 diabetic patients (23%) (8 in type 1 DM, 3 males and 5 females, while 15 in type 2 DM, 7 males, 8 females) came out to have a chest X-ray suggestive of pulmonary TB (TABLE 2). They were labeled as radiologically diagnosed asymptomatic pulmonary TB. Over all, it is slightly more in females and in type 1 DM. Later on, they were confirmed either bacteriologically or through HRCT.

It showed that TB, both pulmonary & extapulmonary, symptomatic & asymptomatic seems more common, chronic and endemic here, in general population and even more common in population at high risk like diabetics, where it is also asymptomatic. So it remains undiagnosed on routine examination or investigation. So they are left untreated, remains infective, and sometimes develop complications. Over all, it is slightly more in females and in type 1 DM.

The possible reasons of this high prevalence here is because of many factors like poverty, illiteracy, unawareness, lack of education on part of diabetic patients, joint family system, overcrowding, poor sanitation, and unhealthy dietary habits, low quality smear examination & detection rate, partial & incomplete treatment, and low level of suspicion on part of a treating physician. All of these patients received positive responses once they were registered with tuberculosis DOTs program, and started on weight-based ATT. Initially conducted on a smaller scale, this randomized study lays the ground work for future larger-scale applications in this field. While simple investigations like chest X-rays or sputum AFBs can easily diagnose pulmonary tuberculosis in diabetic patients, the disease remains endemic and undiagnosed, despite the fact that prompt treatment can reduce disease burden and prevent infection, transmission, and complications.¹⁴

CONCLUSION

A large body of research has linked diabetes mellitus (DM) to worse treatment outcomes and an increased risk of tuberculosis (TB). In this study, we found that tuberculosis (TB) is very common in people with diabetes mellitus (DM). The majority of these cases were identified through screening chest X-rays, and we also found that asymptomatic TB is more common in people with DM. TB appears to be endemic and chronic in our setting. This occurred because neither the patient nor the treating physician noticed any chest symptoms, and the doctor had a low threshold for suspicion. To improve drug compliance, prevent drug resistance, and decrease disease burden, all health care providers should counsel and educate diabetic patients regarding preventive measures against pulmonary tuberculosis (TB). If infected, these patients should be screened using chest X-rays and treated promptly with standard anti-TB drugs with proper doses through diabetes outpatient treatment programmes (DOTs). The early detection and effective treatment of tuberculosis (TB) in diabetic patients depends on doctors being vigilant in their search for asymptomatic cases.

Recommendations: The above study supports our recommendation that all doctors and healthcare personnel be cognizant of the fact that tuberculosis (TB) is a hidden burden, particularly in diabetic patients who do not exhibit any outward signs of the disease (i.e., chest pain). In diabetic individuals who are at high risk of contracting tuberculosis, active case-finding should be conducted. An annual chest radiography check should be performed on these people as part of a TB symptom screening-based case-finding approach. This will allow for early diagnosis and prompt treatment, hence reducing the disease burden and attendant misery. Prevention techniques and, when

necessary, prophylactic anti-TB medicine should be communicated to high-risk individuals.

Author's Contribution:

Concept & Design of Study: Tahir Ullah
 Drafting: Raza Muhammad Khan, NafedUllah Khan
 Data Analysis: Nafed Ullah Khan
 Revisiting Critically: Tahir Ullah, Raza Muhammad Khan
 Final Approval of version: Tahir Ullah, Raza Muhammad Khan

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