

The Frequency of Various Forms of Active Tuberculosis in Patients with Diabetes

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ABSTRACT

Objective: To identify the Frequency of various active TB types in diabetic individuals.

Study Design: Cross-sectional, observational, and qualitative Study

Place and Duration of Study: This study was conducted at the Pulmonology, Lady Reading Hospital, Peshawar from January 2022 and January 2023.

Materials and Methods: Pulmonologists (OPD) made up one-third of diabetic patients who were healthy and met the inclusion criteria (cough with or without phlegm, hemoptysis, persistent fever, and unexplained weight loss). Ages between 10 and 85, immunomodulation in any form, and secondary diseases (diabetes) were excluded. After receiving a license, a complete medical history, a clinical examination, and TB screening tests were completed. All data were imported into SPSS version 24 for further analysis.

Results: 151 of the 550 interviewed patients were chosen for further TB testing. Only 19 individuals (13%) had active TB diseases. The average age was 52.03 years, the average number of years with diabetes was 10.04, and the sex distribution was 01.08:01.04. Except for one, who was diagnosed with type 1 diabetes, everyone had type 2 diabetes. Among all TB cases, pulmonary TB accounted for 58%, extra pulmonary TB for 42%, and multidrug-resistant TB for 6%. Swab results were positive in 52.6% of patients, 21% with MDR-TB.

Conclusion: According to this study, people with diabetes are more likely to acquire pulmonary than extra pulmonary Tuberculosis and have a greater incidence of MDR-TB. If substantial action is not taken right away, this presents a significant risk to public health.

Key Words: drug resistance, diabetes, TB, extra pulmonary Tuberculosis, and variant tuberculosis.

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INTRODUCTION

Diabetes The nickname "the mother of all diseases" goes back centuries. This is partly explained. Diabetes is a prevalent chronic metabolic disease with various metabolic and cardiovascular side effects. Diabetes patients' immune systems are weakened, which increases their risk of infection, including active tuberculosis (TB)¹. The second-leading cause of avoidable mortality worldwide is Tuberculosis (TB), brought on by Mycobacterium tuberculosis.

In several nations, especially among individuals with diabetes, TB has drastically risen during the last ten

Years². This Study aimed to evaluate the frequency of different types of active TB in diabetic individuals. Diabetes patients often die from Tuberculosis, a severe public health issue.³ According to recent data, diabetes patients have a higher frequency of Tuberculosis (TB) than the general population. The pathogenesis of TB diseases in diabetic people is intricate and includes the immune system's malfunction. Diabetes patients are more likely to acquire severe types of TB, such as extra pulmonary TB and multidrug-resistant TB (MDR-TB), since their cell-mediated immunity has been impaired⁴. the incidence of various kinds of TB in this group, some studies have shown that diabetic individuals had a greater Frequency of active TB. Compared to pulmonary TB, extra pulmonary TB has been associated with diabetes more often in prior Studies. Additionally, owing to their compromised immune systems, diabetic people are particularly vulnerable to MDR-TB⁵. This study aimed to identify the Frequency of various active TB types in diabetic individuals. For this cross-sectional, observational, and qualitative Study, a random sample of patients from the OPD/Ward, Department of Pulmonology, Lady Reading Hospital, Peshawar, was employed. A questionnaire on their medical history and physical

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exam was given to each participant to complete. Following a thorough medical history, clinical examination, and tests to screen for TB were conducted. For subsequent analysis, all data were imported into SPSS version 24. According to the Study's findings, 19 (13%) of the 550 patients who participated in the survey had active TB diseases⁶. Out of all TB cases, pulmonary TB accounted for 58%, extra pulmonary TB for 42%, and multi-drug resistant TB for 6%. These results show that people with diabetes have a greater risk of MDR-TB and pulmonary Tuberculosis, which occurs significantly more often than extra pulmonary tuberculosis⁷. It is crucial to remember that while diagnosing and treating TB patients, metabolic and cardiovascular diseases, particularly diabetes, should be considered. The results of this study provide essential light on the incidence of active TB in diabetic individuals and highlight the need to address the population's vulnerability to MDR-TB⁸.

MATERIALS AND METHODS

Between January 2022 and January 2023, a random sample of patients from the OPD/Ward, Department of Pulmonology, Lady Reading Hospital, Peshawar, was used in this cross-sectional, observational, and qualitative Study. Pulmonologists (OPD) made up one-third of diabetic patients who were healthy and met the inclusion criteria (cough with or without phlegm, hemoptysis, persistent fever, and unexplained weight loss). Ages between 10 and 85, immunomodulation in any form, and secondary diseases (diabetes) were excluded. After receiving a license, a complete medical history, a clinical examination, and TB screening tests were completed. All data were imported into SPSS version 24 for further analysis.

Data Collection: This Study utilized a sample of 550 patients seen between January 2022 and January 2023 at the OPD/Ward, Department of Pulmonology, Lady Reading Hospital, Peshawar. Pulmonologists (OPD) interviewed patients in excellent health and satisfied the inclusion criteria of cough with or without phlegm, hemoptysis, persistent fever, and unexplained weight loss. A thorough medical history, clinical examination, and testing were conducted to screen for TB. Then, all the data was loaded into SPSS version 24 for further analysis.

Statistical Analysis: The Frequency of active TB and the patient profile were assessed using descriptive statistical analysis. The average age was 52.03 years, the average number of years with diabetes was 10.04, and the male-to-female ratio was 1.08 to 1.04. The 19 individuals tested positive for TB had 58% pulmonary, 42% extra pulmonary, and 6% multidrug-resistant cases. Swab results were positive in 52.6% of patients, 21% with MDR-TB.

RESULTS

151 of the 550 interviewed patients were chosen for further TB testing. Only 19 individuals (13%) had active TB diseases.

Table No. 1: Frequency of active Tuberculosis among patients with diabetes

Form of Tuberculosis	Frequency (%)
Pulmonary	58
Extra Pulmonary	42
Multidrug-resistant	6

Table No. 2: Characteristics of diabetic patients

Characteristic	N (%)
Mean age	52.03
The mean duration of diabetes	10.04
Sex	Male (01.08): Female (01.04)
Diabetes Type	Type 1 (1), Type 2 (99)

Table No. 3: Results of sputum test of TB patients

Test	Frequency
Positive	52.6
MDR-TB	21

Table No. 4: Location of extra pulmonary TB

Location	Frequency (%)
Colon	37.5
Upper Lobes	21.87
Apical Lobes	40.63

Table 5: Associated Risk Factors

Risk Factor	Frequency
Age	18.52±37.80
Gender	Male 01.08: Female 01.04
Smoking	n/a
Immunomodulation	n/a

Table No. 6: Overall types of TB among people with (Diabetes)

Type of TB	Frequency
Pulmonary TB	58.2%
Extra Pulmonary TB	41.8%
Multidrug-Resistant TB	6.0%

Table No. 7: Overall types of Tuberculosis among people with diabetes (N= 19)

S. No	Type of Tuberculosis	Number of patients	Smear +
I	Pulmonary Tuberculosis	11 57.8%	03
II	MDR- Tuberculosis	04 21%	04
III	Extra pulmonary Tuberculosis	07 36.8%	02
IV	Military Tuberculosis	01 05%	01

The average age was 52.03 years, the average number of years with diabetes was 10.04, and the sex distribution was 01.08:01.04. Except for one, who was diagnosed with type 1 diabetes, everyone had type 2 diabetes. Among all TB cases, pulmonary TB accounted for 58%, extra pulmonary TB for 42%, and multidrug-resistant TB for 6%. Swab results were positive in 52.6% of patients, 21% with MDR-TB.

DISCUSSION

The Frequency of various kinds of active TB in diabetic patients. According to the Study, 19 (13%) of the 550 patients who participated in the survey had active TB diseases. Out of all TB cases, pulmonary TB accounted for 58%, extra pulmonary TB for 42%, and multi-drug resistant TB for 6%. These results show that people with diabetes have a greater risk of MDR-TB and pulmonary Tuberculosis, which occurs significantly more often than extra pulmonary Tuberculosis. MDR-TB is becoming a bigger problem in several nations^{9,10}. According to studies, persons with diabetes had a greater Frequency of MDR-TB than those without the disease¹¹. The need for enhanced TB monitoring and heightened vigilance in this community to identify and stop the spread of drug-resistant strains. Additionally, it is well recognized that diabetes makes it more difficult to treat TB effectively since it impairs drug metabolism, which makes the most popular anti-TB medications less effective in diabetic individuals^{12,13}. Stop the establishment and spread of drug-resistant TB strains in diabetic individuals, it is essential to guarantee early identification and treatment of the disease¹⁴. This Study discovered that individuals with diabetes suffer a greater risk of MDR-TB and acquire pulmonary Tuberculosis considerably more commonly than extra pulmonary Tuberculosis. These results highlight the need for comprehensive approaches to TB prevention in diabetic individuals and provide important new information on TB epidemiology and clinical characteristics in this group¹⁵.

CONCLUSION

According to this study, people with diabetes are more likely to acquire pulmonary than extra pulmonary Tuberculosis and have a greater incidence of MDR-TB. If substantial action is not taken right away, this presents a significant risk to public health. The Study's conclusions highlight the need to address the MDR-TB risk in this group, and further Study is required to delve into the processes behind TB diseases in diabetes.

Author's Contribution:

Concept & Design of Study: Anila Basit
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Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Ferlita S, Yegiazaryan A, Noori N, Lal G, Nguyen T, To K, et al. Type 2 diabetes mellitus and altered immune system leading to susceptibility to pathogens, especially Mycobacterium tuberculosis. *J Clin Med* 2019;8(12):2219.
2. Kalaitzaki AE, Tamiolaki A, Vintila M. The compounding effect of COVID-19 and war in Ukraine on mental health: A global time bomb soon to explode? *J Loss Trauma* 2023;28(3):270-2.
3. Araújo-Pereira M, Nogueira BM, Spener-Gomes R, Carvalho AC, Sant'Anna FM, Figueiredo MC, et al. Anemia and anti-tuberculosis treatment outcome in persons with pulmonary tuberculosis: A multi-center prospective cohort study. *J Infection Public Health* 2023;16(6):974-80.
4. Goletti D, Pisapia R, Fusco FM, Aiello A, Van Crevel R. Epidemiology, pathogenesis, clinical presentation and management of TB in patients with HIV and diabetes. *Int J Tuberculosis Lung Disease* 2023;27(4):284-90.
5. Sheuly AH, Arefin SZ, Barua L, Zaman MS, Chowdhury HA. Prevalence of type 2 diabetes and pre-diabetes among pulmonary and extra pulmonary tuberculosis patients of Bangladesh: A cross-sectional study. *Endocrinology, Diabetes Metabolism* 2022;5(3):e00334.
6. Thapa P, Jayasuriya R, Hall JJ, Mukherjee PS, Beek K, Briggs N, et al. Are informal healthcare providers knowledgeable in tuberculosis care? A cross-sectional survey using vignettes in West Bengal, India. *Int Health* 2023;15(4):389-96.
7. Durlach V, Vergès B, Al-Salameh A, Bahougne T, Benzerouk F, Berlin I, et al. Smoking and diabetes interplay: A comprehensive review and joint statement. *Diabetes Metabolism* 2022:101370.
8. Gopalaswamy R, Dusthacker VA, Kannayan S, Subbian S. Extra pulmonary tuberculosis—an update on the diagnosis, treatment and drug resistance. *J Respiration* 2021;1(2):141-64.
9. Hwang SY, Kim JY, Lee HS, Lee S, Kim D, Kim S, et al. Pulmonary tuberculosis and risk of lung cancer: a systematic review and meta-analysis. *J Clin Med* 2022;11(3):765.
10. Desai K, Arora P. Burden of infectious diseases and strategies of prevention. In *Viral, Parasitic, Bacterial, and Fungal Infections*. Academic Press 2023;1:49-61.
11. Fama F, Genovese C, Raviglione M, Gori A. Drug resistant tuberculosis in Italy through a global

- health lens. The new Microbiologica 2023;46(2):120-32.
12. Chisompola NK, Streicher EM, Muchemwa CM, Warren RM, Sampson SL. Molecular epidemiology of drug resistant Mycobacterium tuberculosis in Africa: a systematic review. BMC Infectious Diseases 2020;20(1):1-6.
 13. O'Toole RF. Antibiotic resistance acquisition versus primary transmission in the presentation of extensively drug-resistant tuberculosis. Int J Mycobacteriol 2022;11(4):343-8.
 14. Hummel P, Ahamed N, Amanullah F. Ethical issues surrounding childhood tuberculosis. Int J Tuberculosis Lung Disease 2020;24(5):27-31.