Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i7.6929

A STUDY OF TREATMENT OUTCOMES AND GENDER BASED DIFFERENCES OF SYMPTOMS TUBERCULOSIS PATIENTS WITH DIABETES MELLITUS: A COHORT STUDY

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ABSTRACT

OBJECTIVE: This study was conducted to evaluate the gender-based differences of symptoms among TB patients having Diabetes mellitus.

BACKGROUND: In developing nations, the rise in type 2 diabetes worldwide is acknowledged as a threat to the prevention of TB. Worldwide, there are 9.6 million new cases of active tuberculosis reported year, of which one million additionally have diabetes.

STUDY DESIGN: A cohort study

PLACE AND DURATION: This study was conducted in Liaquat University of Medical & Health Sciences Jamshoro from January 2023 to January 2024

METHODOLOGY: This study was conducted among newly registered pulmonary TB (PTB) with DM cases. All the patients with tuberculosis were initially included in the study. In the initial interview, 76 patients participated, 03 patient was lost to follow-up. Thus, at the conclusion of the intense period, a first follow-up visit was conducted with 73. The data was entered and analyzed using SPSS version 26.0

RESULTS: There were 51 (69.86%) males and 22 (30.13%) females in the study. The highest proportion (35.62%) belonged to age group 51 to 60 years. Cough was the most common (97.26%) among patients. Loss of weight was observed in 89.04%, weakness, anorexia, mild fever and hemoptysis was observed in 84.93%, 75.34%, 69.86%, and 27.4% respectively.

CONCLUSION: The individuals with TB and DM are more likely to be female, older, obese, and less educated. In the current investigation, the majority of patients were male, literate, between the ages of 51 and 60, living in an urban residential area and belonging to the middle socioeconomic level.

KEYWORDS: Tuberculosis Treatment Outcome, Health Status, Diabetes Mellitus

INTRODUCTION

In developing nations, the rise in type 2 diabetes worldwide is acknowledged as a threat to the prevention of TB [1] Worldwide, there are 9.6 million new cases of active tuberculosis reported year, of which one million additionally have diabetes. [2].

These days, hyperglycemia is a more common condition among TB patients than concurrent HIV infection [3]. Therefore, a link between diabetes and tuberculosis might be the next obstacle to global tuberculosis control [4]. The reciprocal association between diabetes and tuberculosis (TB) indicates that diabetes has been identified as a separate risk factor for tuberculosis development, and that tuberculosis can also cause impaired glucose tolerance (IGT) and diabetes with a new start [5]. Additionally, there is proof that diabetes may affect the prognosis, therapy, radiological results, and symptoms of tuberculosis [6]. Both diabetes mellitus (DM) and tuberculosis (TB) significantly affect patients' quality of life (QoL), including their physical and mental health. The intricate relationship between tuberculosis and diabetes necessitates the creation of a coordinated, interdisciplinary strategy [7]. The SDGs and the WHO Global Action Plan for the Prevention and Control of NCDs both include the goal of reducing early death from NCDs, including diabetes, by 30% by 2030 [8]. In light of the foregoing information, we conducted this research to evaluate the gender based differences of symptoms among TB patients having Diabetes mellitus.

METHODOLOGY

The government sector hospital's newly registered pulmonary tuberculosis (PTB) patients with diabetes mellitus (DM) cases participated in the longitudinal study. All the patients with tuberculosis were initially included in the study. Later, 73 patient who were confirmed to have diabetes mellitus according to HbA1c Reports were made part of this study.

The initial interview with cases occurred after one of the researchers at the selected hospital identified them with TB and began their anti-tuberculosis medication. The first and second follow-up appointments were then held at the selected TU after the end of an intense phase and therapeutic completion, respectively. Out of the 76 patients that took part in the initial interview, 4 patients were lost to follow-up. As a result, following the rigorous phase, a first follow-up visit was held with 73. All the patients had a second follow-up visit at the conclusion of their care.

Interview techniques were used to gather data using pre-tested, semi-structured, and performed questionnaires. The questionnaire asked questions on treatment results, QoL among TB with DM patients, TB and DM-related information, and sociodemographic characteristics. Asian categorization was used to compute and classify body mass index (BMI).

We labelled the patient as cured when a patient with tuberculosis who had bacteriological confirmation of the disease at the start of therapy, but who had previously tested negative for the disease on at least one occasion and in the last month of treatment. We labelled it completed therapy when a tuberculosis patient who has finished therapy without showing any signs of failure but who does not have any documentation demonstrating that, in the last month of treatment, sputum smear or culture results were negative at least once, either due to incomplete testing or unavailable results. SPSS version 26.0 was used to enter and analyze the data.

RESULTS

There were 22 (30.13%) females and 51 (69.86%) males in the current study. The patients from rural and urban areas were nearly equal (49.32% and 50.38%). nearly one fourth (26.03%) of the subject had no formal education. The highest proportion (35.62%) belonged to age group 51 to 60 years of

age. Most of the participants (58.9%) belonged to middle socioeconomic class. The gender distribution for the variables is detailed in the table I.

Table I: General Features of Tuberculosis in Patients with Diabetes Mellitus

Variable	Male (n=51)		Female (n=22)		Total (n=73),	
	n	(%)	n	(%)	n	(%)
Area of Residence						
Urban	22	43.14	14	63.64	36	49.32
Urban slum	29	56.86	8	36.36	37	50.68
Education level	51					0.00
No education	13	25.49	7	31.82	19	26.03
Educated	38	74.51	15	68.18	53	72.60
Age group in years						
<30	5	9.80	1	4.55	6	8.22
31-40	10	19.61	4	18.18	14	19.18
41-50	11	21.57	3	13.64	14	19.18
51-60	20	39.22	6	27.27	26	35.62
>60	5	9.80	8	36.36	13	17.81
Occupation	51					0.00
Service	11	21.57	3	13.64	14	19.18
Manual	27	52.94	1	4.55	28	38.36
Household	1	1.96	16	72.73	17	23.29
Unemployed/Retired	12	23.53	3	13.64	15	20.55
Socio-Economic Class						
Upper	7	13.73	4	18.18	11	15.07
Middle	31	60.78	12	54.55	43	58.90
Lower	13	25.49	5	22.73	18	24.66

According to our findings, cough was the most common (97.26%) among patients. Loss of weight was observed in 89.04%, weakness, anorexia, mild fever and hemoptysis was observed in 84.93%, 75.34%, 69.86%, and 27.4% respectively. The gender based distribution of symptoms of Diabetes, Tuberculosis, and mental health are detailed in table II.

Table I: At the time of diagnosis, signs and symptoms of diabetes mellitus with tuberculosis

Variable	Male (n=51)		Female (n=22)		Total (n=73),	
	n	(%)	n	(%)	n	(%)
DM symptoms						
Frequent urination	23	45.10	5	22.73	28	38.36
Excessive thirst and hunger	21	41.18	9	40.91	30	41.10
Tingling and numbness	14	27.45	6	27.27	20	27.40
Mental health		0.00		0.00	0	0.00

Fatigue	45	88.24	19	86.36	64	87.67
Sleep disturbance	30	58.82	12	54.55	42	57.53
Negative emotions	19	37.25	9	40.91	28	38.36
Socially inactive	12	23.53	11	50.00	23	31.51
TB symptoms						
Cough	50	98.04	21	95.45	71	97.26
Loss of weight	46	90.20	19	86.36	65	89.04
Weakness	45	88.24	17	77.27	62	84.93
Anorexia	41	80.39	14	63.64	55	75.34
Mild Fever	36	70.59	15	68.18	51	69.86
Dyspnea	20	39.22	8	36.36	28	38.36
Chest pain	15	29.41	6	27.27	21	28.77
Hemoptysis	11	21.57	9	40.91	20	27.40
Adverse Drug Reaction						
Nausea and vomiting	24	47.06	14	63.64	38	52.05
Itching	14	27.45	8	36.36	22	30.14
Gastritis	9	17.65	5	22.73	14	19.18

DISCUSSION

An estimated 50% of DM patients in developing countries are unaware that they have the disease, and an increasing number of TB clinics are becoming into centers for new DM diagnoses worldwide. Multivariate analysis and a Pakistani study found that patients with TB and DM are more likely to be older, obese, female, and less educated. Research from South India and the Texas–Mexico border reveals that the profile of TB patients with newly diagnosed DM differs from those with previously diagnosed DM: they are more likely to be male, younger, and illiterate. [9, 10].

The majority of the patients in this research were male, literate, living in an urban slum area, and belonging to the medium socioeconomic level. They were also between the ages of 51 and 60 years. The various research regions and demographic characteristics are likely to be the cause of this difference in prevalence.

Diabetes patients may experience a quicker rate of TB infection progression than non-diabetics. In diabetics, the clinical presentation of tuberculosis may change. Diabetes significantly affects how tuberculosis presents clinically. It was discovered that TB patients with diabetes mellitus had worse performance status and higher levels of symptoms, with a symptom score of >4 out of 6 (cough, hemoptysis, dyspnea, fever, night sweats, and weight loss) [8,11,12]. The most prevalent TB symptoms among patients in the current study were anorexia, weight loss, coughing, and an increase in body temperature in the evening.

The current study demonstrated statistically significant improvements in mental health symptoms at the end of therapy and on follow-up visits. According to an Indonesian study, TB with DM co-morbidity had a significant effect on overall health, pain, physical functioning, mental difficulties, and incapacity to work due to physical health issues ($P < 0.05$) [13]. An individual with tuberculosis (TB) may experience increased symptoms, such as cough and night sweats, which may interfere with everyday activities or sleep.[14] Patients' quality of life will be impacted if they have co-morbidities that cause them to feel pain and discomfort in addition to tuberculosis.[13]

In the current study, when tuberculosis was diagnosed, approximately one-third of the patients were underweight as opposed to overweight or obese. However, those with successive visits and at the conclusion of treatment showed improvements in their nutritional condition. Similarly, a Karnataka research found that at the time of TB diagnosis, more patients were underweight (22.5%) and normal (35.2%) than were overweight (9.2%) or obese (2.8%) [15]. A total of 54.1% of TB with DM patients were underweight, 40.4% had normal BMIs, and 5.5% were overweight or obese at the time of diagnosis, according to a prospective cohort research carried out in Ethiopia. Patients in the TB with

DM group saw a noteworthy rise in their basic metabolic rate throughout the anti-TB therapy period [16].

In diabetic TB patients, undernutrition may also be a sign of inadequate glycemic management. Patients with diabetes mellitus who are malnourished experience elevated blood glucose levels as a result of stress hormone production being stimulated [17]. Thus, for TB patients with DM co-morbidity, adequate counselling and nutritional assistance are crucial.

CONCLUSION

Individuals with TB and DM are more likely to be female, older, obese, and less educated. In the current investigation, the majority of patients were male, literate, between the ages of 51 and 60 years, living in an urban residential area and belonging to the middle socioeconomic level.

SOURCE OF FUNDING

There was no any funding involved

CONFLICT OF INTEREST

The Authors declared no any conflict of interest

ETHICAL APPROVAL

It was taken before study

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