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Comorbidity among Patients with Tuberculosis at AL Najaf Governorate

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Abstract

Tuberculosis (TB), an infectious disease caused by Mycobacterium tuberculosis, is easily transmissible between individuals. Although its primary impact is on the lungs, TB can also affect various other organs such as the kidneys, spine, and brain. The disease spreads through the release of bacteria-laden droplets into the air when an infected person coughs, sneezes, or talks, leading to airborne transmission.

Aim: This study aims to determine the prevalence of comorbidity in patients diagnosed with tuberculosis and those seeking treatment for chest illnesses in a consultant clinic.

Method: A case-control study was conducted in a consultant clinic located in the al-Najaf Governorate. The study population comprised 356 individuals, with 118 individuals designated as cases and 236 individuals as controls. The data collection period spanned from January 2023 to April 2023.

Results: The analysis revealed that individuals diagnosed with tuberculosis had an average age of 46.5 ± 18.28 years, while those in the control group had an average age of 47.8 ± 16.60 years. The statistical analysis yielded p-values of 0.04, 0.02, and 0.01 for different parameters such as malnutrition, severe kidney disease, and cough.

Conclusion: This study provides insights into the prevalence of comorbidity among patients with tuberculosis and individuals seeking treatment for chest illnesses. The findings highlight variations in age distribution between the two groups and present significant p-values for specific parameters. These results contribute to a better understanding of the relationship between tuberculosis and comorbid conditions, emphasizing the importance of continued research and effective management strategies.

Keywords: *Patients, Comorbidity, Tuberculosis, BMI.*

Introduction

In 2019, there are expected to be 10 million new cases of tuberculosis (TB), which will result in 1.4 million fatalities [1]. This disease continues to be a serious threat to public health across the world. Mycobacterium tuberculosis is responsible for the illness, which predominantly affects the lungs but may also affect other areas of the body such as the brain, kidneys, and spine [2]. Because tuberculosis (TB) may spread via the air when an infected person coughs or sneezes, the disease is considered to be very infectious. Even though tuberculosis may be cured and treated with medications, the disease continues to spread due to factors such as poverty, malnutrition, and inadequate healthcare systems [3]. According to the findings of a number of studies, there is a wide variety of risk

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factors for tuberculosis infection and illness. Some of these risk factors include age, gender, socioeconomic position, HIV status, diabetes, smoking, alcohol consumption, and exposure to indoor air pollution [4-6].

In spite of recent improvements, tuberculosis (TB) is still a potentially lethal disease that may be passed from one person to another in any part of the globe [7]. According to estimates provided by the World Health Organization (WHO), 9.6 million people were infected with tuberculosis in 2014, and 1.5 million died as a direct result of the disease [8]. According to estimates provided by WHO, around 70 percentage points of the world's total tuberculosis infections were concentrated in South-East Asia and Africa. The total number of cases was higher in South-East Asia, but the incidence rate was comparable to that of Africa, coming in at 226 per 100,000 people in South-East Asia and 237 in Africa. However, the proportion of tuberculosis cases among persons who were living with HIV was much greater in Africa (27%) than it was in South-East Asia (3%) [9]. The bulk of high-incidence countries in 2017 were situated in these two regions. Despite the fact that the total prevalence of tuberculosis in this area was relatively low, the percentage of TB patients that were classified as MDR TB was much higher in the WHO European region (40%) than it was in any other region (range = 3.6%–6.3%) [10,11]. There was a discernible drop in the number of people throughout the globe who suffered from TB in the latter part of the twentieth century. As a consequence of the amelioration of the economic and nutritional position, the lessening of congestion, the use of chemotherapy, and the other factors mentioned. But in recent years, the number of TB infections has risen. This is the result of a number of causes, including the proliferation of AIDS, the usage of injectable drugs, and an increase in the number of people who are immune-compromised [12]. In addition to affecting a number of other bodily organs, tuberculosis often affects the lungs. Typical symptoms of active tuberculosis include a persistent cough that produces bloody sputum, fever, nocturnal sweats, and weight loss. When a person with active lung tuberculosis coughs, sneezes, speaks, or spits, they spread the tuberculosis bacteria into the air. When breathed in, only a limited number of these microorganisms are capable of causing an illness [13,14]. The aim of this research is to determine the frequency of comorbidity among people with tuberculosis and to determine the association between comorbidity and some variable.

Subject and Method

Administrative arrangement: An official request was submitted through the College of Health and Medical Technology to AL-Najaf Health Directorate (Training and Development Department heading) for approval of the study to seek permission for data collection in the consultant clinic for TB and chest disease in Najaf City.

Study design: A case-control study was carried out in a consultant clinic for TB and chest disease in Najaf city.

Time of study: The data collection continued for a period of 4 months starting on 25 December 2022 to ending on 25 April 2023.

Place of study: The place of study was in a consultant clinic for TB and chest disease in AL-Najaf city.

The study sampling: included 354 adults (118 cases and 236 controls) from age 15- 80 years old.

The setting of the study: The study was conducted in Najaf city at the consultant clinic for TB, the visit to the consultant clinic for TB during the study period throughout the week, 8 am to 2 pm. The case data were collected from patients who have respiratory symptoms and signs who get tested for TB and their findings were positive tuberculin test from a consultant clinic for TB.

The control data were collected from participants who have respiratory diseases and when they were tested for tuberculin test, their results were negative.

Inclusion criteria: Participants over the age of 15, Both genders were included study and Participants from Najaf city.

Exclusion criteria: Participants under 15 years old, Participants from outside Najaf city, and Participants who have TB drug resistance.

Ethical consideration: Because of the sensitivity of the subject to participants, were informed that participation in the study was voluntary. And all information will be used for the study only.

Data collection technique: After acquiring an official agreement from the Department of Preparation and Training/branch of Studies and educational research in the Najaf education directorate. The data was collected by direct interview with the participant after translating the questionnaire to the local language (Arabic) by using close-ended questions. after explaining the objectives of the study and assuring them that the data taken will be reserved confidentially. The questionnaire included closed-ended questions the questionnaire sheet was divided into 3 broad sections.

Statistical examination: the data shows the statistical package that is available from SPSS-26 was used to do the analysis of the collected data. The data were presented in the form of straightforward metrics such as frequency, percentage, mean, and standard deviation. Chi-square was used in order to determine the risk variables that are independently related to tuberculosis.

Results

Table (1): Malnutrition status score among case and control (N=354).

	Group	N	Mean	SD	P-value
Malnutritional Status Score	Case	118	2.28	.805	0.001*
	Control	236	2.06	.453	

*High significant difference between the two independent means using Students-t-test at 0.05 level.

The correlation between the malnutrition score and tuberculosis is shown in Table 1. There was a statistically significant difference (p-value = 0.001) between the case group, which had a mean malnutrition score of 2.28, and the control group, which had a score of 2.06, among the participants. According to these data, there seems to be a possible connection between malnutrition and tuberculosis (TB), with greater levels of malnutrition being more prevalent in TB patients.

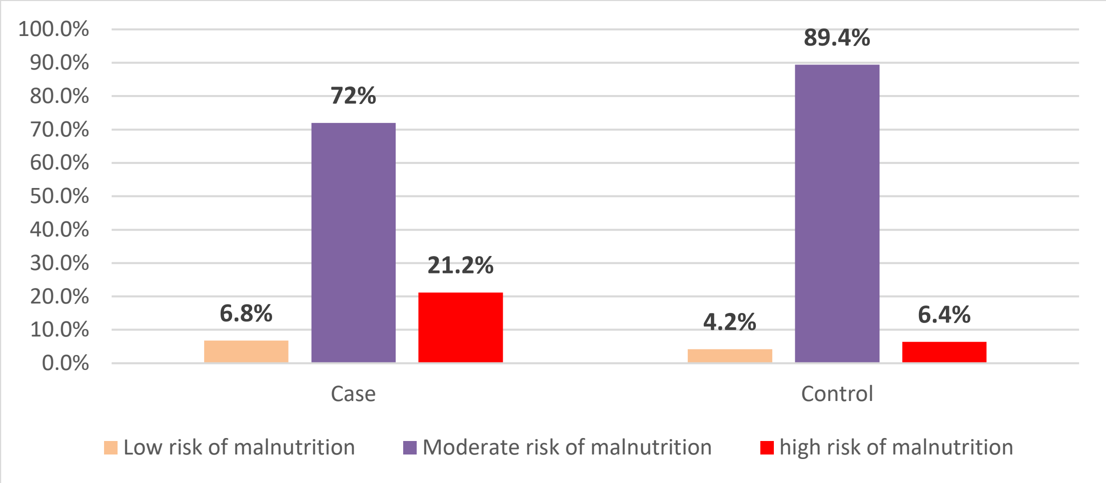

Figure 1: Malnutrition status score among cases and control group (N= 354)

Seventy-two percent of the patients were considered to have a moderate risk of malnutrition, whereas 21.2% were considered to have a high risk, and 6.8% were considered to have a low risk. According to the data shown in Figure 1, 89.4% of the controls were at moderate risk of malnutrition, 6.4% were at high risk, and just 4.2% were at low risk.

There was no discernible difference in the prevalence of malnutrition between TB patients who were male or female. According to the data shown in Table (2), there was also no discernible variation in the likelihood of malnutrition across the various age groups of TB patients.

Table (2): Malnutrition status score among cases according to gender and age group (N=118).

		Malnutrition score				P-value
		Risk for malnutrition		Normal		
		No.	%	No.	%	
Gender	Male	30	46.2%	31	58.5%	0.182
	Female	35	53.8%	22	41.5%	
Age group	>20	4	6.2%	2	3.8%	0.142
	20-29	9	13.8%	14	26.4%	
	30-39	8	12.3%	10	18.9%	
	40-49	12	18.5%	4	7.5%	
	50-59	12	18.5%	4	7.5%	
	60-69	11	16.9%	13	24.5%	
	≥70	9	13.8%	6	11.3%	
Difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.						

Table (3): Comorbidities among case and control groups (N=354).

Comorbidities	Class	Case		Control		P-value
		No.	%	No.	%	
Diabetes	Yes	43	36.4%	68	28.8%	0.14
	No	75	63.6%	168	71.2%	

Hypertension	Yes	47	39.8%	96	40.7%	0.08
	No	71	60.2%	140	59.3%	
HIV infection	Yes	1	0.8%	1	0.4%	0.55
	No	117	99.2%	235	99.6%	
sever kidney disease	Yes	10	8.5%	41	17.4%	**0.02***
	No	108	91.5%	195	82.6%	
head and neck cancer	Yes	1	0.8%	4	1.7%	0.52
	No	117	99.2%	232	98.3%	
medical treatment such as corticosteroids	Yes	11	9.3%	28	11.9%	0.47
	No	107	90.7%	208	88.1%	
specilized treatment for rheumatoid arthritis or crohnes disease	Yes	44	37.3%	87	36.9%	0.93
	No	74	62.7%	149	63.1%	
Cough	Yes	49	41.5%	153	64.8%	**0.001***
	No	69	58.5%	83	35.2%	
Asthma	Yes	28	23.7%	61	25.8%	0.66
	No	90	76.3%	175	74.2%	
taken gastric acid inhibitors	Yes	18	15.3%	39	16.5%	0.75
	No	100	84.7%	197	83.5%	
*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level. Fisher's exact test at 0.05 level used for cell have an expected count of less than 5.						

In Table 3, some of the comorbidities that were found in both the TB cases and the control group are included. Diabetes was present in 63.6% of the people who were diagnosed with tuberculosis, whereas it was present in 71.2% of the people in the control group. There was not a significant difference between the two groups according to the statistics (P = 0.14). 39.8% of participants had hypertension, compared to 40.7% of participants in the control group. It was determined that there was not a statistically significant difference between the two groups (P = 0.08). In this particular research, only 0.8% of patients with the disease and 0.4% of healthy controls tested positive for HIV infection; the difference between the two groups was not statistically significant (P = 0.55).

The prevalence of severe renal illness was higher in patients diagnosed with tuberculosis; 8.5% of these patients had this comorbidity, whereas only 17.4% of the control group did (P = 0.02). This difference was not statistically significant (P = 0.52), since there was only one patient diagnosed with head and neck cancer and four healthy controls. Medical therapy, such as corticosteroids, was more frequent in the control group, with 11.9% having this comorbidity, in comparison to 9.3% of patients (P = 0.47). There were 37.3% of cases and 36.9% of controls who were receiving specialized therapy for rheumatoid arthritis or Crohn's disease, and the difference between the two groups did not meet the criteria for statistical significance (P = 0.93). Cough was more widespread among those who were diagnosed with tuberculosis; 41.5% of individuals with TB had this symptom, while 64.8% of controls did (P = 0.001). There was no significant difference in the prevalence of asthma between the two groups (23.7% among patients and 25.8% among controls; P = 0.66). Last but not least, the use of gastric acid inhibitors was comparable across the two groups, with 15.3% of patients and 16.5% of controls having this comorbidity (P = 0.75).

Discussion

We created the following demographic characteristics, malnutrition status; and comorbidities as TB risk factors in order to define TB risk factors at the AL-Najaf governorate in Iraq. This was done in order to determine TB risk factors. According to the findings of the research, there is no link between chronic illnesses (such as diabetes, high blood pressure, and asthma) and HIV disease or cancer of the head and neck, nor is there a connection between these diseases and the medications (such as corticosteroids, rheumatism therapy, and the use of PPI treatment) [15,16]. However, there is a significant link between TB and both chronic renal disease and cough. Researchers in Nigeria conducted research to determine the incidence of diabetes among people with tuberculosis (9.5%). In comparison to the other percentages found in our research, this one is a fairly insignificant figure [17,18]. This disparity in findings can be attributable to individuals' various histories at the time of illness start, as well as their varied patterns of nutritional consumption [19].

In Taiwan, researchers showed that persons with TB had a prevalence of high blood pressure of (50%) whereas the control group had a prevalence of (64.2%), with a value of 0.31 [20,21]. These findings are consistent with our findings. It's possible that a limited number of current TB infections is responsible for the low prevalence of hypertension among infected patients. The other risk factor for cardiovascular disease is being overweight [22]. However, the BMI of our subjects is rather low. This provides an explanation for the relatively low frequency of instances of hypertension. Inactive TB was shown to be prevalent among individuals with renal impairment [23], according to the findings of another research conducted in Taiwan. those on dialysis had a greater frequency of latent tuberculosis (25%) compared to those with severe chronic renal disease who did not receive dialysis (11%) [24,25]. According to the findings of our research, the lack of renal illness is closely linked to the presence of TB. In this context, further investigations are required to identify the nature of the connection between TB and renal illness [26].

The presence of asthma was shown to be a risk factor for tuberculosis in a cohort study conducted in Taiwan. According to the findings of the research, the presence of asthma and COPD is connected with a value of 0.001 increased risk of TB. When treating severe conditions with ICS, there is also an increased risk factor [27]. A longer course of ICS treatment at a higher dosage results in prolonged hospitalization, which in turn raises the chance of acquiring a form of hospital-acquired tuberculosis known as nosocomial TB [28]. This research examined samples from all of the participants who had asthma and lung disorders, including those who had TB. This is the primary reason why the findings of this study are different from the findings of our study. In our research, we took samples of TB at random.

Cough was more prevalent in TB cases, accounting for 41.5% of cases compared to 64.8% of controls, which is similar to the results of a retrospective study Done in.....in which 82 out of 108 cases of pulmonary tuberculosis reported cough of median (IQR) duration 4 (1–8) weeks. Regarding comorbidities, the study showed that cough was more prevalent in TB cases, accounting for 41.5% of cases compared to 64.8% of controls. Because coughing is both a sign of and a defensive strategy against respiratory illnesses, as well as a complicated physiological phenomenon, this discovery is not unexpected. Coughing serves both of these functions. According to Zimmer et al. [29], coughing is a characteristic sign of pulmonary tuberculosis and is clinically examined at every stage of the TB care cascade.

According to the findings of research on HIV/AIDS patients that was carried out in China. It has been shown that when people are infected with TB, this further encourages the reproduction of the virus and speeds up the development of immunodeficiency virus illness. This was discovered via research conducted in the United Kingdom. Stimulating cytokines is another way that immunodeficiency virus might make a person more susceptible to infection [30]. In the study by Cui et al. [31], it was shown that persons who had both TB and HIV had a CD4 T cell count c/mm3 that was similar to 188.78 + 235.95 at a value of 0.001 and OR=5.946.

Patients who have a family history of tuberculosis and those who have used glucocorticoids, even in low doses, have an increased risk of developing the disease [33]. According to the findings of a meta-analysis conducted in the United States, the risk of developing active TB in patients who also had head and neck cancer was more than sixfold [34]. Even if it has gone down, the relative precipitation is still quite high, and the data suggest that there is a correlation between TB and cancer of the head and neck at a value of 0.001. A lowered resistance to tuberculosis might be the cause of the infection risk [35]. The very low incidence of head and neck cancer that we saw in our research leads us to disagree with the findings presented here.

To investigate the nature of the relationship between PPI and TB patients, a controlled case study was carried out in Taiwan. The association was favorable when cumulative dosage was included, but unfavorable when cumulative time was considered. Where it was found that the length of time spent being exposed to PPI is similar to 6.06% over the course of months when the value is 0.13. Although the total dosage was 1.25 times the OR [36]. This is because repeated use of PPI weakens the acidic stomach defense system, which in turn makes it easier for germs to progressively proliferate and spread throughout the stomach [37].

Conclusion

This study showed, there seems to be a possible connection between malnutrition and tuberculosis (TB), with greater levels of malnutrition being more prevalent in TB patients. There was no discernible difference in the prevalence of malnutrition between TB patients who were male or female. some of the comorbidities that were found in both the TB cases and the control group are included, Diabetes is the largest one and the HIV disease is the smallest relation infection.

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