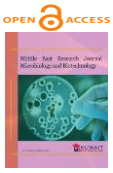

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Socio-Demographic Characteristics of Patients with Pulmonary Tuberculosis in Salah-Aldeen Province, Iraq

Mohemid Maddallah Al-Jebouri[1*], Khalid Omer Mohammed Ali[2]
[1]Department of Medical Laboratory Technology, Health and Medical College of Technology, Al-Qalam University, Kirkuk, Iraq
[2]Department of Microbiology, College of Medicine, University of Tikrit, Tikrit, Iraq

Abstract: ***Background*:** *Mycobacterium* is a genus of Gram-positive bacilli that demonstrates the staining characteristic of acid-fastness. Its most important species, *Mycobacterium tuberculosis*, is the most common etiologic agent of tuberculosis. ***Materials and Methods*:** This study was carried out in the Antituberculosis and Chest Diseases Center in Tikrit city. Sputa of 479 patients referred to the laboratory were examined. All patients complaining of fever, night sweat, weight loss, cough, shortness of breath and haemoptysis. Socio-demographic characters of the patients were record. These characters included age, gender, occupation, education, residence, income, family history of T.B. and town of birth. X-rays of chest were also carried out and diagnosed. ***Results*:** 92 (19.2%) were positive for *Mycobacterium tuberculosis.* Fifty-three (17.3%) were positive of acid-fast bacilli (AFB) stain, whereas 18.4% were culture positive. Almost 4% of the positive cases of T.B. were seen during May of the year. X-rays of 83 (17%) patients showed signs of pulmonary tuberculosis (T.B.). Socio-demographic characteristics of T.B. patients were also demonstrated and the results were gathered and analyzed. ***Conclusions*:** 92 (19.2%) were positive for *Mycobacterium tuberculosis.* Fifty-three (17.3%) were positive of acid-fast bacilli (AFB) stain, whereas 18.4% were culture positive. Almost 4% of the positive cases of T.B. were seen during May of the year. X-rays of 83 (17%) patients showed signs of pulmonary tuberculosis (T.B.). There was a high frequency of isolation of *M. tuberculosis* at spring which was 32.6%., while at Autumn revealed 13% of isolation only. The present study shows that 71.8% of patients with pulmonary tuberculosis come from urban areas. The occupational distribution of tuberculosis was not uniform across genders. Tuberculosis cases were disproportionately concentrated among individuals with lower educational attainment and among those belonging to fair or low socioeconomic categories.

Keywords: Patients, Demographic Characteristics, Incidence, Salah-Aldeen Province, Iraq.

Research Paper

***Corresponding Author:**
Mohemid Maddallah Al-Jebouri
Department of Medical Laboratory Technology, Health and Medical College of Technology, Al-Qalam University, Kirkuk, Iraq

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INTRODUCTION

Mycobacterium is a genus of Gram-positive bacilli that demonstrates the staining characteristic of acid-fastness. Its most important species, *Mycobacterium tuberculosis*, is the most common etiologic agent of tuberculosis [1]. *M. tuberculosis* has a waxy mycolic acid lipid complex coating on its cell surface, making the cells impervious to Gram staining [2]. Mycobacteria have some unique qualities that are divergent from members of the Gram-positive group, such as the presence of mycolic acids in the cell wall [3, 4]. Other species like *M. bovis, M. microti, M. canettii, M. pinnipediiand M.* and *Caprae* were also reported to be causative agents of various types of tuberculosis [5]. Tuberculosis causes ill-health among millions of people each year and ranks as the second leading cause of death from an infectious disease worldwide [6]. TB usually affects the lungs but it can also affect other parts of the body, such as brain, intestines, kidneys, or the spine. Symptoms of TB depend on where in the body the TB bacteria are growing. In the cases of pulmonary TB, it may cause symptoms, such as chronic cough, pain in the chest, haemoptysis, weakness or fatigue, weight loss, fever, and night-sweats [7]. Iraq shows its dedication and commitment to prevent and control TB. Between 2003 and 2012, the TB case detection rate gradually and consistently increased to reach 57% which is 8, 664 TB cases in 2012. Eighty-nine per cent (89%) of infectious

cases detected were successfully treated. Care for drug-resistant forms of TB was expanded and innovative partnerships were developed between the public and private sectors, as well as with civil society, TB-affected communities, donors and media and consistently increased to reach thousands cases in 2012 particularly pulmonary type [8]. Despite appreciable progress made against TB in Iraq, there is still 43% of the total estimated number of TB cases is missed every year, leaving thousands of untreated TB patient suffering and causing the suffer to others. Other works on this disease have been carried out that showed different frequencies of incidences utilizing onsite serological rapid tests [9, 10]. Since 1980, Iraq is passing through a series of wars that might influence the status of infectious diseases including TB. There are two main types of TB; one is the latent TB, which means a person carries the TB germ but is not sick and cannot pass the germ on to other people and the other type is active TB [11]. When a person develops active TB disease, the symptoms (such as cough, fever, night sweats, or weight loss) maybe mild for many months. This can lead to delays in seeking care, and results in transmission of the bacteria to others. People with active TB can infect 10–15 other people through close contact over the course of a year. Without proper treatment, 45% of HIV-negative people with TB on average and nearly all HIV-positive people with TB will die [12]. People infected with TB bacteria have a 5–15% lifetime risk of falling ill with TB. Persons with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a much higher risk of falling ill [13-15]. Tuberculosis (TB) is transmitted when a person with TB expels *M. tuberculosis* complex into the air through coughing and other respiratory activities [16]. Tuberculosis can be fully cured with appropriate anti-TB medication. It primarily affects the lungs but can also affect other parts of the body [17]. Tuberculosis can be classified according to drug resistance as drug-susceptible TB (cases in which susceptibility to isoniazid and rifampicin is confirmed by rapid drug susceptibility testing or conventional drug susceptibility testing) and drug-resistant TB caused by strains resistant to one or more anti-TB medications [18, 19]. According to the World Health Organization's Global Tuberculosis Report2024 [20], 8.2 million people worldwide were newly diagnosed, confirmed and officially notified as TB cases in 2023. The highest annual number since WHO began systematic global surveillance in the mid-1990s, indicating a potential resurgence of the global TB epidemic [21-24].

MATERIALS AND METHODS

Health Institute

This study was carried out in the Antituberculosis and Chest Diseases Center in Tikrit city. The goal of this study was to diagnose and treat all cases of tuberculosis. The patients included in the present study were from different towns including the city center of Tikrit of Salah-Aldeen governorate. The present study was carried out in the laboratory of this health institute according to methods previously followed by other workers [10-23].

Patients

Sputa of 479 patients referred to the laboratory were examined. The ages of patients ranged from 13 to 65 years. Some patients were referred to the center from other towns' hospitals. All patients complaining of fever, night sweat, weight loss, cough, shortness of breath and haemoptysis. Socio-demographic characters of the patients were record. These characters included age, gender, occupation, education, residence, income, family history of T.B. and town of birth.

X-Ray Examination

Patients referred to laboratory were examined by means of X-ray. These x-rays were examined and read by a radiologist and the results were included in the present study for comparison and conformation of the laboratory results of investigation [14-22].

Statistical Analyses

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics such as means, standard deviations, and frequency distributions were computed to summarize the data. A paired sample t test correlation coefficient (R) and coefficient of determination (R2) were calculated [25-27].

RESULTS

Rate of Isolation of Mycobacterium Tuberculosis

Sputa of 479 patients with chest infection symptoms associated with fever, weight loss, cough, night sweat, shortness of breath and haemoptysis attended or referred to the Antituberculosis and Chest Disease Center in Tikrit city were investigated.92 (19.2%) were positive for *Mycobacterium tuberculosis.* Fifty-three (17.3%) were positive of acid-fast bacilli (AFB) stain, whereas 18.4% were culture positive (Table 1). Almost 4% of the positive cases of T.B. were seen during May of the year. X-rays of 83 (17%) patients showed signs of pulmonary tuberculosis (T.B.). The Mann–Whitney U test demonstrated a highly significant difference between the monthly distribution of examined patients and the monthly distribution of confirmed tuberculosis cases ($P < 0.001$). This result indicates that the number of TB cases recorded each month was significantly lower than the number of patients examined, reflecting the expected disparity between the screened population and confirmed infections (Figure 1).

$$\text{TB incidence (\%)} = \frac{\text{TB cases}}{\text{Patients examined}} \times 100$$

Table 1: Frequency of presentation of *Mycobacterium tuberculosis* in sputa of patients

Month	*Patients examined		Smear +ve/ Culture +ve	Smear -ve/ culture +ve	Smear +ve/ Culture -ve	**Total patients with M.T.		Chest X=ray
	No.	%				No.	%	
October	28	5.8	1	1	0	1	0.2	1
November	24	5	3	3	0	2	0.4	2
December	36	7.5	3	3	0	6	1.3	6
January	31	6.5	6	2	1	9	1.0	5
February	35	7.3	8	0	1	11	2.3	10
March	45	9.5	7	0	0	8	1.7	8
April	25	5.2	4	0	2	4	0.8	4
May	63	13.1	16	0	0	18	3.8	14
June	50	10.4	8	0	0	8	1.7	8
July	57	11.9	12	0	0	12	2.5	11
August	31	6.5	4	0	0	4	0.8	4
September	54	11.3	9	0	0	9	1.9	9
total	**479**	**100**	**79 (16.5)**	**9 (1.9)**	**4 (0.8)**	**92**	**19.2**	**82(17)**

*Total number of positive smears=83(17.3%); Total number of positive cultures=88(18.4).
**M.T., *Mycobacterium tuberculosis*.

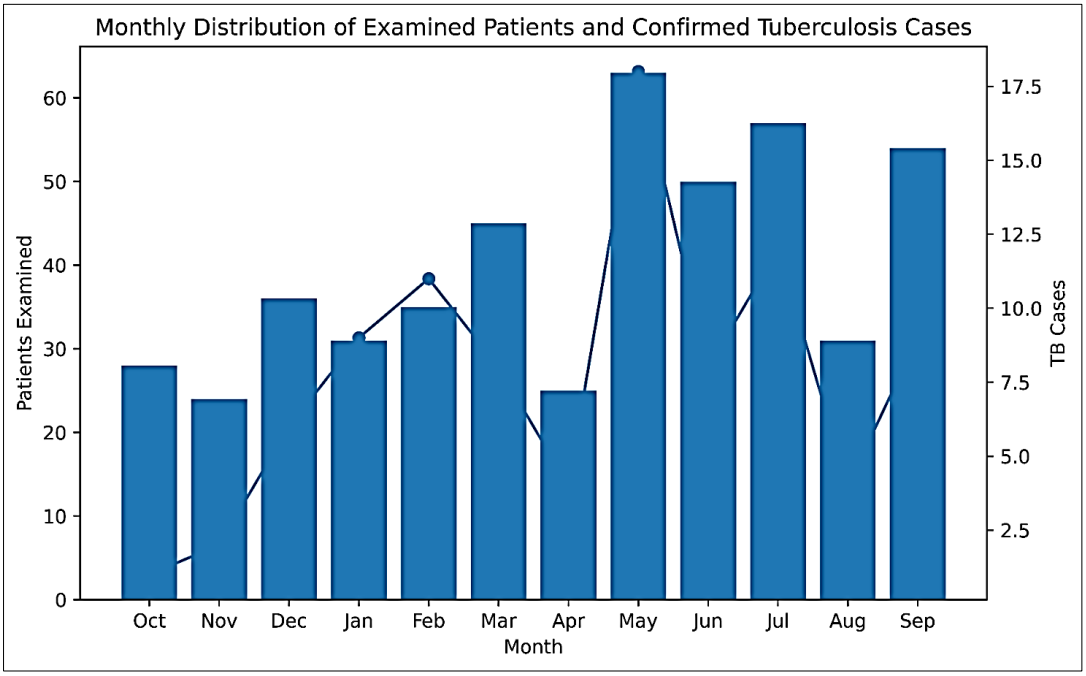

Figure 1: Monthly Distribution of Examined Patients and Confirmed Tuberculosis Cases

Effect of Month and Season

There was a high frequency of isolation of *M. tuberculosis* at spring which was 32.6%., while at Autumn revealed 13% of isolation only i.e. 30/92 (Table2). October of the year showed one case only to be T.B. identified. Spring showed the highest seasonal burden of tuberculosis (30 cases; 32.6%), followed by winter (26 cases; 28.3%), summer (24 cases; 26.1%), and autumn (12 cases; 13.0%). Patient attendance was highest during summer (138 examined) and spring (133 examined). The significant Mann–Whitney result indicates that the seasonal distributions of examined patients and tuberculosis cases were not equivalent, suggesting seasonal variation in tuberculosis occurrence during the study period (Figure 2).

Table 2: Distribution of *Mycobacterium tuberculosis* according to month/season

Season	Month	Patients examined		Patients with *Mycobacterium tuberculosis*	
		No.	%	No.	%
Autumn	September	54	11.3	9	9.3
	October	28	5.8	1	1.1
	November	24	5.0	2	2.2
	Total	106	22.1	12	13.0
Winter	December	36	7.5	6	6.5
	January	31	6.5	9	9.8
	February	35	7.3	11	12
	Total	102	27.8	26	28.3
Spring	March	45	9.4	8	8.7
	April	25	5.2	4	4.3
	May	63	13.2	18	19.6
	Total	133	27.8	30	32.6
Summer	June	50	10.4	8	8.7
	July	57	11.9	12	13
	August	31	6.5	4	4.3
	Total	138	28.8	24	26.1
Overall		**479**	**100**	**92**	**19.2**

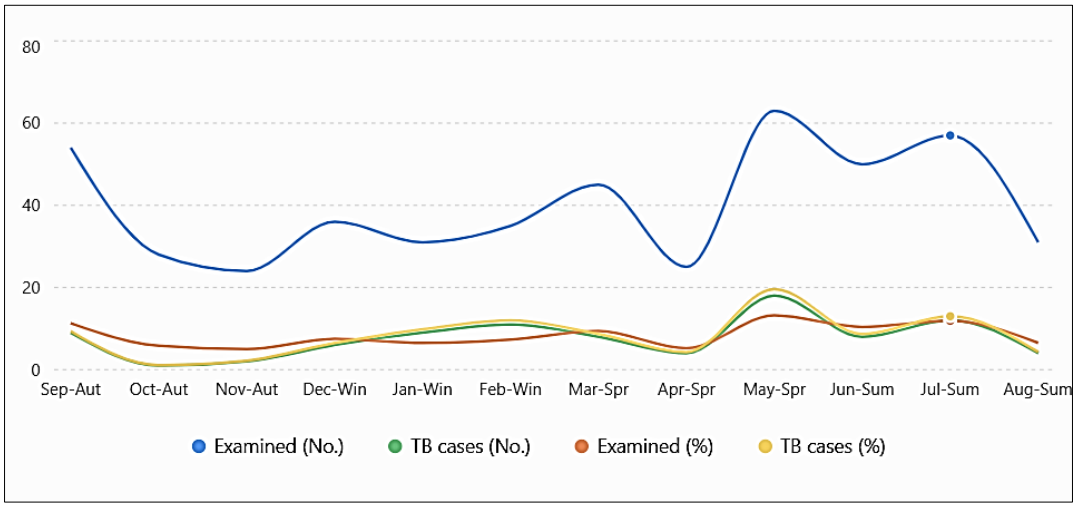

Figure 2: Monthly and Seasonal Distribution of Examined Patients and Mycobacterium tuberculosis Cases

Effect of Age and Gender

The present study revealed that the high frequency of T.B. isolation and identification was among the age groups 21-30 followed by age group31-40 years old and the percentage was 35.9 and 26.1% respectively. Tuberculosis was more prevalent among males and the percentage of isolation was 68.5%. The highest incidence of T.B. in female was detected to be associated with age group 31-40 (Table3, Figure 3). There is a statistically significant difference between the distributions of examined patients and tuberculosis cases across age groups ($P < 0.01$).

Table 3: Distribution of Mycobacterium tuberculosis within age and gender of T.B. patients

Age/year	Patients examine						Patients with *Mycobacterium tuberculosis*					
	Male		Female		Total		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
11-20	40	27.4	11	3.3	51	10.6	7	13.5	4	13.8	11	12
21-30	111	76.0	49	14.7	160	33.4	26	41.3	7	24.1	33	35.9
31-40	81	55.5	38	11.4	119	24.8	13	20.6	11	37.9	24	26.1
41-50	25	17.1	15	4.5	40	8.4	4	6.3	2	6.9	6	6.5
51-60	57	39	25	12	82	17.1	9	14.3	4	13.8	13	14.1
60-71	19	13	8	2.4	27	5.6	4	6.3	1	3.4	5	5.4
Total	**333**	**100**	**146**	**100**	**479**	**100**	**63**	**100**	**29**	**100**	**92**	**100**

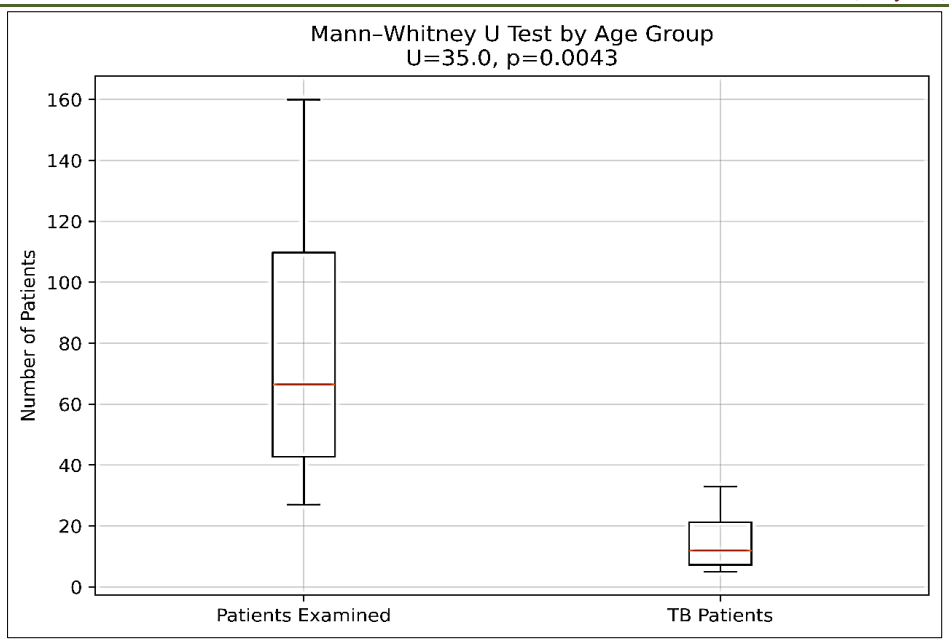

Figure 3: Comparison of Examined Patients and Tuberculosis Cases across Age Groups Using Mann–Whitney U Test

Effect of Residence

The present study shows that 71.8% of patients with pulmonary tuberculosis come from urban areas (Table 4). Tikrit city showed the highest incidence of T.B. with frequency of 33.7% and the lowest incidence was seen among attendants coming from Balad town (2.2%). The distribution of *Mycobacterium tuberculosis* cases was uneven across residential locations. Urban residents constituted the majority of both examined patients and confirmed tuberculosis cases. Tikrit represented the principal center of tuberculosis occurrence, while Baiji, Tozz, and Samarra also contributed substantially to the disease burden. The relatively high case yield observed in Sharkat and Al-Faris may indicate localized transmission patterns or increased disease prevalence in these areas, warranting further epidemiological investigation.

Effect of Education

It was shown that 52.2% of patients with T.B. were illiterate whereas the group of high education showed 4.3% of T.B. cases only (Table 5). A good socioeconomical status patients show low incidence of pulmonary tuberculosis (3.3%), whereas patients of fair and low levels of living showed collectively higher incidence of the disease (96.7%). Tuberculosis cases were disproportionately concentrated among individuals with lower educational attainment and among those belonging to fair or low socioeconomic categories. The significant Mann–Whitney U test result (U = 71.0, P = 0.008) suggests that the distribution of tuberculosis cases differed significantly from the distribution of the examined population across education and socioeconomic strata. This finding supports the role of social and educational factors in tuberculosis occurrence and highlights the importance of targeted public health interventions in vulnerable populations.

Table 4: Distribution of *Mycobacterium tuberculosis* according to residence

Residence		**Patients examined**		**Patients with M.T.**	
		No.	**%**	**No.**	**%**
Area	Urban	316	66	66	71.8
	Rural	163	34	26	28.2
	Total	479	100	92	100
Town	Tikrit	170	35.5	31	33.7
	Aldoor	33	6.9	5	5.4
	Samarra	71	14.8	13	14.1
	Tozz	81	16.9	15	16.3
	Sharkat	12	2.5	4	4.3
	Baiji	81	16.9	18	19.6
	Al-Faris	21	4.4	4	4.3
	Balad	10	2.1	2	2.2
Total		**479**	**100**	**92**	**100**

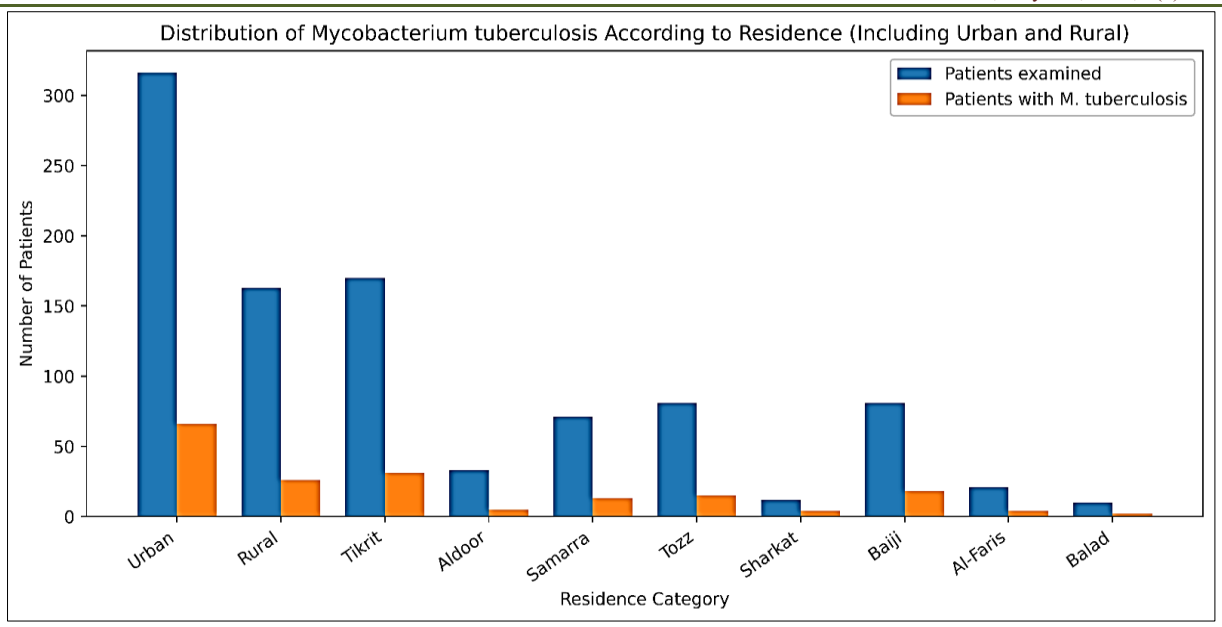

Figure 4: Distribution of Mycobacterium tuberculosis According to Residence (Including Urban and Rural)

Table 5: Distribution of *Mycobacterium tuberculosis* according to education and socioeconomic status

Parameter		Patients examined		Patients with M.T.	
		No.	%	No.	%
Education level	Illiterate	248	51.8	48	52.2
	Read and write	30	6.3	9	9.8
	Primary school	96	20	13	14.1
	Intermediate school	69	14.4	14	15.2
	Secondary school	21	4.4	4	4.3
	Graduate	15	3.1	4	4.3
	Total	479	100	92	100
Socioeconomical status	Low	210	41.8	17	18.5
	Fair	257	53.7	72	78.3
	Good	22	4.6	3	3.3
	Total	**479**	**100**	**92**	**100**

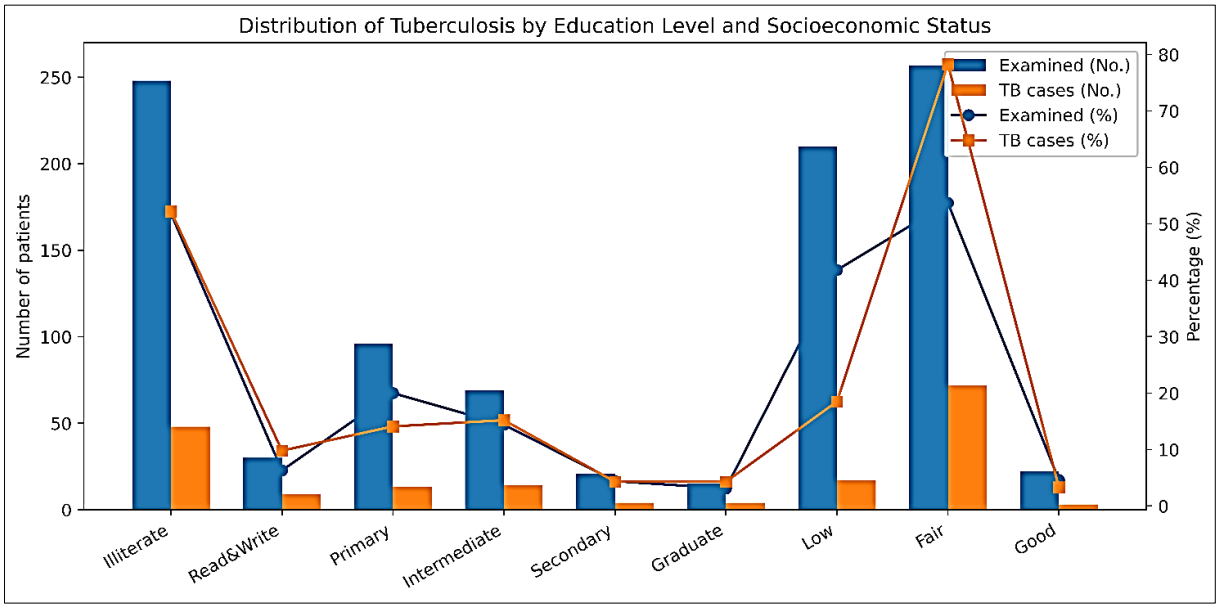

Figure 5: Distribution of Tuberculosis According to Education Level and Socioeconomic Status

Effect of Occupation

The present study revealed 36.5% of the males of private duties were infected with tuberculosis and this frequency was the highest among males of different occupation groups. Student males showed the lower incidence by this pathogen (Table 6). Housewives were mostly under risk of catching T.B. as the present study revealed that 89,7% of the total females were T.B. infected. The occupational distribution of tuberculosis was not uniform across genders. Private-sector workers, farmers, and military personnel constituted the principal occupational groups affected among males, whereas housewives represented the predominant affected category among females. The significant Mann–Whitney U result (U = 79.5, P = 0.028) suggests that tuberculosis cases were distributed differently from the examined population across occupational categories.

Table 6: Distribution of *Mycobacterium tuberculosis* according to gender and occupation of patients

Sex	Occupation	Patients examined		Patients with M.T.	
		No.	%	No.	%
Male	Private	132	39.7	23	36.5
	Unemployed	25	7.5	4	6.3
	Military	11	3.3	11	17.5
	Employee	55	16.5	7	11.1
	Farmer	72	21.6	11	17.5
	Student	22	6.6	3	4.8
	Worker	16	4.8	4	6.8
	Total	333	100	63	100
Female	Housewife	134	93.0	26	89.7
	Employee	10	6.9	1	3.4
	Child	2	1.4	2	7.0
	Total	146	100	29	100

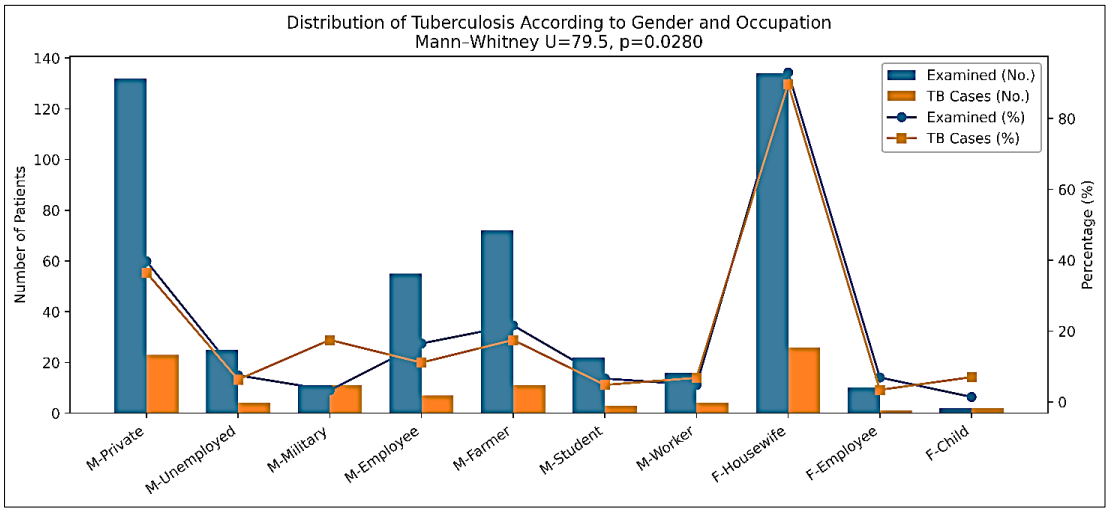

Figure 6: Distribution of Mycobacterium tuberculosis According to Gender and Occupation

Effect of Patient's History of Tuberculosis

The present study revealed that almost 85% of the total patients under study were identified T.B. patients for the first time. Other 15.2% were attended as recurrent cases of pulmonary T.B.(Table 7). New attendants constituted the vast majority of tuberculosis patients in both sexes, particularly among females. Recurrent tuberculosis cases were relatively uncommon. The Mann–Whitney U test did not demonstrate a significant difference between treatment-history categories (U = 3.0, P = 0.200), suggesting that the observed variation may be attributable to random sampling variation rather than a systematic difference

Table 7: Distribution of *Mycobacterium tuberculosis* according to treatment history of patients

History	Male		Female		Total	
	No.	%	No.	%	No.	%
New attendants	21	72.4	57	90.5	78	84.8
Recurrent cases	8	27.6	6	9.5	14	15.2
Total	29	100	63	100	92	100

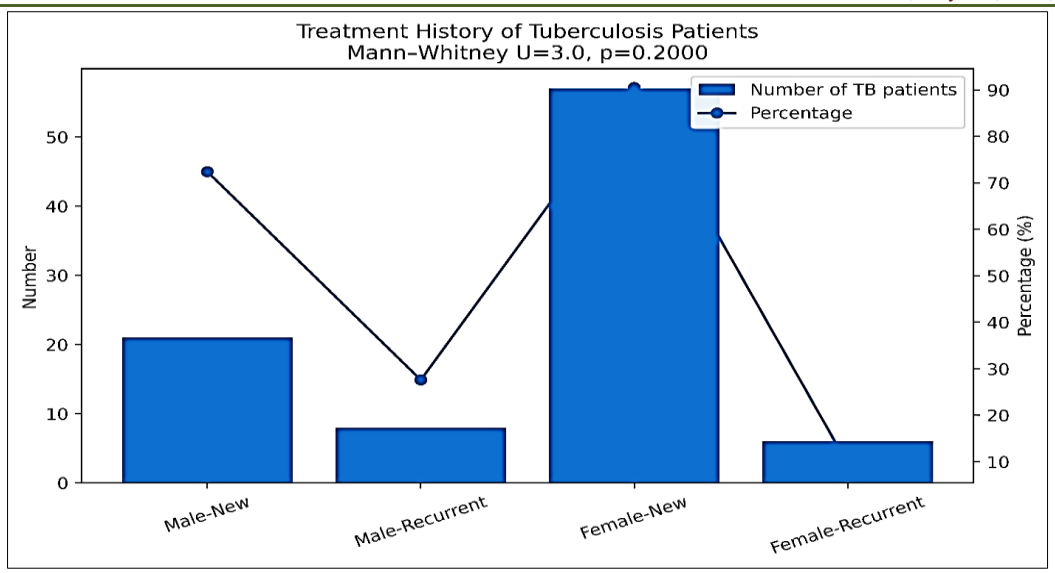

Figure 7: Distribution of Mycobacterium tuberculosis Patients According to Treatment History

DISCUSSION

Sputa of 479 patients with chest infection symptoms associated with fever, weight loss, cough, night sweat, shortness of breath and haemoptysis attended or referred to the Antituberculosis and Chest Disease Center in Tikrit city were investigated.92 (19.2%) were positive for *Mycobacterium tuberculosis.* Fifty-three (17.3%) were positive of acid-fast bacilli (AFB) stain, whereas 18.4% were culture positive. Almost 4% of the positive cases of T.B. were seen during May of the year. X-rays of 83 (17%) patients showed signs of pulmonary tuberculosis (T.B.). This result was almost similar to that concluded by Zangana who found that 22,5% of patients during his study were complaining of pulmonary tuberculosis in Salahaldeen province [28], but the result was higher than that reported by Najem *et al*., in Baghdad [29]. However, Al-Jebouri and Wahid demonstrated slightly higher frequency of T.B. cases in Kirkuk governorate [15], and almost similar distribution was concluded by Ismail and Al-Jebouri [10]. However, Analysis of an aggregated dataset of 7 nationally representative surveys from Africa showed the role of environmental-demographic factors in patterns of TB prevalence. Population density, Latitude, and urbanization emerged as significant positive correlates, indicating the heightened TB prevalence in areas at 7.6 and 14.6 ◦ absolute latitude, densely populated areas, and urban centers. In contrast, altitude above 900 m, precipitation between 50 and 100 mm with higher temperature were inversely associated with TB prevalence [30]. Moreover, there was a high frequency of isolation of *M. tuberculosis* at spring which was 32.6%., while at autumn revealed 13% of isolation only i.e. 30/92. October of the year showed one case only to be T.B. identified. Spring showed the highest seasonal burden of tuberculosis (30 cases; 32.6%), followed by winter (26 cases; 28.3%), summer (24 cases; 26.1%), and autumn (12 cases; 13.0%). It was shown that 52.2% of patients with T.B. were illiterate whereas the group of high education showed 4.3% of T.B. cases only. A good socioeconomical status patients show low incidence of pulmonary tuberculosis (3.3%), whereas patients of fair and low levels of living showed collectively higher incidence of the disease (96.7%). Furthermore, it was found elsewhere that the urban residence, even after adjustment for population density, which is a known sociodemographic TB risk factor [42, 43]. This suggests that urban environment by itself increases TB incidence, its duration, or both. These urban-rural disparities are consistent with findings from other regions. 43 Contributing factors could include higher HIV prevalence in urban areas, poor living conditions and access to diagnosis and treatment–particularly in settlements of rural-urban migrants that increasingly make up large parts of African urban area [30-36].

However, the present study revealed that the high frequency of T.B. isolation and identification was among the age groups 21-30 followed by age group31-40 years old and the percentage was 35.9 and 26.1% respectively. Tuberculosis was more prevalent among males and the percentage of isolation was 68.5%. The highest incidence of T.B. in female was detected to be associated with age group 31-40. There is a statistically significant difference between the distributions of examined patients and tuberculosis cases across age groups Given established gender differences in TB epidemiology, we conducted stratified analyses by sex [37]. The APC model demonstrated consistently higher male risk across all ages—a pattern observed in Japan, Canada, and Australia where male TB rates exceed female rates in most age groups [38, 39]. This disparity is likely multifactorial. In the studied settings, where significant differences in social engagement or healthcare access between men and women are unlikely, biological mechanisms and health related behaviors may play more prominent roles [40]. Evidence suggests that female hormones may have a protective effect against

TB infection and development [21-42]. Moreover, the present study revealed 36.5% of the males of private duties were infected with tuberculosis and this frequency was the highest among males of different occupation groups. Student males showed the lower incidence by this pathogen. Housewives were mostly under risk of catching T.B. as the present study revealed that 89,7% of the total females were T.B. infected. Family income is also influenced by the number of dependents in the family and the type of work. Family income above the average will increase a person's awareness to get a balanced nutritional intake that affects a person's nutritional status in increasing body resistance in responding to infectious diseases, one of which is pulmonary TB. Income also increases a person's affordability in obtaining health services. With access to health services, a person can prevent disease with regular control [43, 44]. Occupational variables in this study are known to have a significant relationship with the incidence of pulmonary TB. The analysis stated that someone who worked turned out to be a protective factor for pulmonary TB. Several studies have stated that a person's employment status is related to a person's risk for developing pulmonary TB. A person's employment status is a socio-demographic aspect related to income and describes the level of economic ability which is closely related to several aspects, namely health [45-49]. Some research results state that a person with poor nutritional status has 18.5 times the risk of being infected with TB compared to normal nutritional status. Another study also showed that a person whose nutritional status is below normal BMI <18 has a 2.5 times risk of being infected with TB compared to normal nutritional status [19]. However, the present study showed that 52.2% of patients with T.B. were illiterate whereas the group of high education showed 4.3% of T.B. cases only. A good socioeconomical status patients show low incidence of pulmonary tuberculosis (3.3%), whereas patients of fair and low levels of living showed collectively higher incidence of the disease (96.7%).Moreover, it was found that Knowledge in the form of information about pulmonary TB includes transmission and prevention of TB germs to increase knowledge and cause a response in the form of attitudes in someone to information on TB disease prevention efforts that they know. Finally, the stimulus in the form of information on TB disease prevention efforts that he has known and fully realized will lead to a further response, namely in the form of action or in connection with the stimulus or information on TB disease prevention efforts [46-50]. Furthermore, the present study revealed that almost 85% of the total patients under study were identified T.B. patients for the first time. Other 15.2% were attended as recurrent cases of pulmonary T.B. New attendants constituted the vast majority of tuberculosis patients in both sexes, particularly among females. Recurrent tuberculosis cases were relatively uncommon. On the other hand, the results concluded elsewhere showed that the history of contact with TB patients was a significant factor associated with the risk of TB. The results of a related study stated that a person with a history of contact with TB patients had a 3.1 times greater risk of being infected with TB than those who did not have a history of contact with TB patients. Another study also stated that those who had close contact with TB patients had a 1.3 times greater risk of becoming infected with TB compared to those who did not have close contact with TB patients. History of contact with patients is the most frequent risk factor associated with the incidence of TB in children. Close contact is one of the assessment indicators based on the scoring technique for diagnosing TB in children [51-54]. Moreover, in many countries with a high infectious diseases including TB burden, prevalence appears to be linked to both geographic determinants, in particular altitude, latitude, precipitation, and temperature, and sociodemographic determinants, in particular population density and urbanization. These data suggest that in addition to health system factors such as access to care, some of the variation in TB prevalence could be explained by environmental demographic factors [55-60]. However, Iraq passed through series of wars and sanction led to adverse conditions attacked local population causing social, psychological, immunological and damages family structures and living standards leading to various infectious diseases and pollution of the local environment facilitating many routes of infections transmission [61-66]. Furthermore, another factor that causes smoking behavior to increase the risk of TB is the particle size of cigarettes and other chemicals that have a role in the emergence of airway inflammation. Besides that, the content in cigarettes can cause structural changes in TB bacteria exposure. The function of lung fluid production will also increase for both normal people and those with pulmonary TB. Smoking causes changes in natural and acquired cell immunity which can affect macrophages and leukocytes [67-74].

CONCLUSIONS

92 (19.2%) were positive for *Mycobacterium tuberculosis.* Fifty-three (17.3%) were positive of acid-fast bacilli (AFB) stain, whereas 18.4% were culture positive. Almost 4% of the positive cases of T.B. were seen during May of the year. X-rays of 83 (17%) patients showed signs of pulmonary tuberculosis (T.B.). The Mann–Whitney U test demonstrated a highly significant difference between the monthly distribution of examined patients and the monthly distribution of confirmed tuberculosis cases ($P < 0.001$). There was a high frequency of isolation of *M. tuberculosis* at spring which was 32.6%., while at autumn revealed 13% of isolation only. There is a statistically significant difference between the distributions of examined patients and tuberculosis cases across age groups ($P < 0.01$). The present study shows that 71.8% of patients with pulmonary tuberculosis come from urban areas. The occupational distribution of tuberculosis was not uniform across genders. Private-sector workers, farmers, and military personnel constituted the principal occupational groups affected among males, whereas

housewives represented the predominant affected category among females. New attendants constituted the vast majority of tuberculosis patients in both sexes, particularly among females. Recurrent tuberculosis cases were relatively uncommon. Tuberculosis cases were disproportionately concentrated among individuals with lower educational attainment and among those belonging to fair or low socioeconomic categories.

Statement of Ethics: All the procedures involving human participation were conducted in strict accordance with ethical standards of Institutional Research Committee, Department of Scientific Research, Tikrit University as well as the 1964 Helsinki Declaration and its subsequent amendments or equivalent ethical norms.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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