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Article

Epidemiological Study of Prevalence TB in Iraq

Asmaa A. AL-Kaisse[*1], Amina N.AL-Thwani[1], Ahmed A. Mankhi[2], Zainab H. Abood[1] and Ruqaya Mustafa Ali[3]

[1] Institute of Genetic Engineering and Biotechnology for Post Graduate Studies/ Baghdad University; mailto: asmaa.adnanalqaisi@yahoo.com
[2] National Specialized Center for Chest and Respiratory Diseases, Ministry of Health and Environment, Baghdad /Iraq.
[3] Ministry of Agriculture, Veterinary Department /Baghdad / Iraq.
* Correspondence: mailto: asmaa.adnanalqaisi@yahoo.com

Abstract: To assess the prevalence of tuberculosis epidemic in Iraq in terms of the age groups most affected by tuberculosis bacteria, for both gender and for all governorates of Iraq, various clinical specimens were obtained from 744 patients attending the Specialized Chest and Respiratory Disease Center / National Reference Laboratory (NRL) for tuberculosis in Baghdad between 15 of April and 14 of November 2021 the diagnosis by direct microscopy using the Zeihl-Nelsen (ZN) stain and followed by culturing on Lowenstein-Jensen medium (L.J), for 744 clinical specimens revealed that 92(12.37%) specimens were positive by direct examination while 111(14.9%) specimens were positive by culturing on L.J medium with sputum specimens accounting for the majority of culture positive specimens 103/111(92.8%) the rate of Pulmonary tuberculosis (PTB) was a higher than (EPTB) extrapulmonary (94.6%), (5.4%) respectively the most of tuberculosis cases were found in Baghdad city (62.2%) vs other governorates (37.8%) males were more affected (63.0%) than females (37.0%) and the majority of patients were aged 35–44 years (30.6%) but the lowest age group was least than 15 years (1.8%) the data above ** ($P \leq 0.01$) showed a statistically significant difference, cultivation dependence most be more sensitive than direct method and require more attention in TB control programs to healing patients.

Keywords: Tuberculosis; *Mycobacterium tuberculosis*; Iraq.

1. Introduction

Infectious tuberculosis, or TB, is a leading cause of death and poor health in the world, and it can be contracted by anyone. Before the coronavirus (COVID - 19) pandemic, TB was the largest cause of death from a single infectious disease. Higher than HIV/AIDS in terms of both treatability and preventability is tuberculosis (TB). A six-month pharmacological regimen is effective in treating about 85% of people with TB illness [1]. TB infection can be treated with a regimen lasting one to six months. 1.3 million more people will die from tuberculosis-related causes in 2020 than from HIV/AIDS-related causes combined (0.68 million). The COVID-19 outbreak has had a greater impact on TB mortality than HIV/AIDS in 2020. The number of people who died from HIV/AIDS fell between 2019 and 2020 [2], in contrast to the number of people who died from tuberculosis. Most of the droplets released from the mouth, nose, and throat when someone talks or coughs transmit tuberculosis, a respiratory disease. However, tuberculosis can also spread to other regions of the body, such as the lymph nodes, pleura, belly and urogenital tract [3, 4], skin and joints [5, 6], bones [7, 8], and the meninges. Extrapulmonary tuberculosis is the name given to this subsequent type of the illness. Although no signs or symptoms of tuberculosis may be present, a continuing immune response to Mycobacterium tuberculosis (M. tb) antigens is what the World Health Organization (WHO) considers to be an LTBI. The World Health Organization estimates that approximately one-fourth of the world's population is infected by Mtb and has a latent TB infection (LTBI) [4]. In order to reduce the risk of poor treatment outcomes, health sequelae, as well as the negative social and economic consequences of tuberculosis, the first goal is to ensure that tuberculosis disease is exposed early and treated promptly; the second goal is to reduce community-level TB disease prevalence, thus preventing the spread of tuberculosis in the future in fetuses and children. There is a connection between these two objectives. Preventative treatment for tuberculosis (TB) can be provided to individuals who have been diagnosed with the disease, therefore decreasing the chance of future cases of illness [5]. TB and other kinds of tuberculosis are both affected by this (TB). According to a WHO research, the frequency of tuberculosis in Iraq would reach 27 cases per 100,000 people by the year 2020, according to WHO. A steady decline in disease prevalence had occurred throughout the prior decade [6].The goal of this research was to find out how common tuberculosis is among Iraqi patients.

2. Materials and Methods

Collection of Samples In order to investigate Mycobacterium tuberculosis, a total of 744 diagnostic specimens were collected from patients who went to the "Specialized Chest and Respiratory Disease Center/National Reference Laboratory for Tuberculosis (NRL) in Baghdad" between the 15th of April and the 14th of November 2021. There were 429 males, which accounts for 60.0 percent of the total, and 315 females, which accounts for 37.0 percent of the total. The ages of the individuals ranged from a few months to over 65 years. The specimens were divided into two categories: those with pulmonary tuberculosis 603 and those with extrapulmonary tuberculosis 141, (Table 1).

Sample Processing: In order to digest and disinfect the specimens, standard operating protocols for laboratory manual labor were followed [7]. Ziehl Neelsen (ZN) stain was employed in smear microscopy, which is a form of direct inspection. This was done in order to examine all clinically decontaminated specimens.

Cultivation: Each decontaminated specimen was injected into L.J media by spreading three to four drops of centrifuged sediment all over the surface of three slops of L.J medium. This was done in order to culture the bacteria. After having each culture sit at an angle for three days at 37 degrees Celsius with the lids only partially closed, the lids were secured and the cultures were incubated vertically for a total of eight weeks (culture were examined weekly). After this period of incubation, the growth was either observed or dismissed as a negative, and the results were recorded according to whether they were positive or negative. It takes anywhere from six to eight weeks for the results of solid culture to become visible. In order to gain further identifications, the growth rate, colony morphology, and ZN staining of positive cultured isolates were also used.

3. Results

3.1 Colony morphology and staining

During of 8 weeks, the results of culture on L.J media became seen. M. tuberculosis complex colonies on L.J media were big, uneven in form, scratchy, tough, and non-pigmented, similar to coli flower colonies. Bacilli were straight or slightly curved red dotted rods organized singly or in pairs when microscopic inspection of culture isolates with ZN dye was performed.

3.2 Coverage of the database

According to the results obtained, pulmonary TB (PTB) specimens accounted for 603(81%) of the total 744 specimens, whereas extrapulmonary TB (EPTB) specimens accounted for 141(19%), as indicated in table (2). Smear microscopy (direct examination) revealed that 92(12.37%) specimens were positive, 111(14.9 %) specimens were able to develop on L.J media, and culture examination revealed 633 negative specimens. ** ($P \leq 0.01$), very significant difference between all category specimens. The positive cultivation rate of M. tuberculosis complex from pulmonary tuberculosis (PTB) specimens was greater 105/111(94.6%) than extrapulmonary tuberculosis (EPTB) specimens 6/111(5.4%), with a highly significant difference ** ($P \leq 0.01$) between them. Sputum specimens 103/111(92.8%) had the highest proportion of bacterial growth out of 111 specimens, whereas PTB specimens 103/105 had a higher rate (98.1%).

3.3 Tuberculosis prevalence in Baghdad and neighboring governorates

In table (3) shows that Bagdad city had a greater percentage of culture positive specimens than other governorates, with 69/111(62.2%) specimens being positive by cultivation on L.J media, compared to 42/111 (37.8%) in other governorates, with very significant dereference ** ($P < 0.01$), shows.

3.4 Connection of tuberculosis with gender and age

The data that were presented in table (4) indicated that males had a significantly higher prevalence of tuberculosis than females did; the overall male to female attribution was 1.7 (70/41), and the variation was statistically significant. The data also indicated that the ratio of males to females was significantly different ($P<0.01$). The patients were placed in one of the table's seven distinct age groups, which were assigned to them in accordance with their ages in table (5). The age groups (35–44 years) exhibited higher frequencies of TB cases (30.6 percent) than any other age groups, while the age groups (15 years) with percentage (1.8 percent) were revealed to be the least recorded age groups, with highly significant differences between all age groups ** ($P < 0.01$).

Table 1. Specimen numbers and kinds

No	Specimen type	Number	Percentage (%)
1.	Sputum (Sp.)	546	73.3
2.	Bronchoalveolar lavage -(BAL)-	57	7.7
Total pulmonary TB specimens		603	81.0
3.	42	5.6	5.6
4.	26	3.5	3.5
5.	18	2.4	2.4
6.	11	1.5	1.5
7.	11	1.5	1.5
8.	11	1.5	1.5
9.	8	1.1	1.1
10.	7	1.0	1.0
11.	4	0.5	0.5
12.	2	0.3	0.3
13.	1	0.1	0.1
Total extra pulmonary TB specimens		141	19.0
Total		**744**	**100%**
Chi-square-χ^2		**--**	**22.075 ****
P-value		**--**	**0.0001**
** (P≤0.01)			

Table 2. Division of specimens according to the kind of TB and test.

Specimen		No. of Specimens	Type of examination				
			Direct		Culture		% of positive culture
			+Ve	-Ve	+Ve	-Ve	
PTB	Sputum	546	88	458	103	443	92.8%
	Bronchoaveolar Lavage – (BAL)	57	1	56	2	55	1.8%
EPTB	Pleural fluid (Pl.F)	42	2	40	3	39	2.7%
	Aspiration	1	0	1	1	0	0.9%
	Cerebrospinal fluids - CSF	4	0	4	1	3	0.9%
	PUS	7	1	6	1	6	0.9%
	Ascetic fluid (AF)	26	0	26	0	26	0%
	General Biopsy	18	0	18	0	18	0%
	Abscess	11	0	11	0	11	0%
	Urine	11	0	11	0	11	0%
	Swab	11	0	11	0	11	0%
	Body Fluid	8	0	8	0	8	0%
	Gastric fluid (GF)	2	0	2	0	2	0%
Total		744	92	652	111	633	--------
%		---	12.37	87.6	14.9	85.0	100%
Chi-square-χ2		---	421.50 **		366.24 **		46.741 **
P-value		---	0.0001		0.0001		0.0001
**** (P≤0.01).**							

Table 3. Apportionment of tuberculosis cases in Baghdad and other governorates

Governorate		No. of Specimens	Culture		% of positive culture
			+Ve	-Ve	
1	Baghdad	506	69	437	62.2%
2	Wasit	27	9	18	8.1%
3	Dhi Qar	32	6	26	5.4%
4	Nineveh	11	6	5	5.4%
5	Al-Anbar	19	2	17	1.8%
6	Al-Basra	5	2	3	1.8%
7	Al-Najaf	14	2	12	1.8%
8	Babylon	15	2	13	1.8%
9	Diyala	21	2	19	1.8%
10	Karbala	15	2	13	1.8%
11	Salah Al-Dien	15	2	13	1.8%
12	Al-Diwaniyah	2	1	1	0.9%
13	Al-Muthanna	6	1	5	0.9%
14	Al-Sulaymaniyah	8	1	7	0.9%
15	Dohuk	6	1	5	0.9%
16	Erbil	18	1	17	0.9%
17	Kirkuk	13	1	12	0.9%
18	Maysan	11	1	10	0.9%
Total		744	111	633	100%
Chi-square-χ 2		---	---	---	21.583 **
P-value		---	---	---	0.0001
** (P<0.01).					

Table 4. Divide of TB patients according to gender

Sex	No. of Specimens	Culture Based Diagnosis	
		+Ve	%
Male	429	70	%
Female	315	41	63.0%
Total	744	111	37.0%
Chi-square-χ 2	---	---	100%
P-value	---	---	9.027 **
**** (P<0.01).**			

Table 5. Patients diagnosed with tuberculosis are classified according to age group.

Age group (year)	No. of Specimens	Culture Based Diagnosis	
		+Ve	%
< 15	35	2	1.8
15 – 24	103	11	9.9
25 – 34	126	18	16.2
35 – 44	153	34	30.6
45 – 54	142	21	19.0
55 – 64	101	14	12.6
> 65	84	11	9.9
Total	744	111	100%
Chi-square-χ 2	---	---	11.782**
P-value	---	---	0.0003
**** (P<0.01)**			

4. Discussion

The direct smear microscopy method, which is applied frequently in the third world and particularly in Iraq, is one of the methods that can be used to diagnose tuberculosis. When it comes to the diagnosis of tuberculosis, the LJ culture medium is usually recognized as the gold standard in underdeveloped nations [8]. In terms of the clinical manifestations that they cause, pulmonary tuberculosis (also known as PTB) and extrapulmonary tuberculosis (also known as EPTB) are the two most frequent types of tuberculosis (TB). The pleura, lymph nodes, bones, and the meningeal lining of the brain are not the only organs that tuberculosis (TB) can affect; it can also affect other organs (extrapulmonary tuberculosis, EPTB). Even though pulmonary tuberculosis is the most common form of the condition, it is not the only kind of tuberculosis (PTB).

Pulmonary TB (PTB) expands at a quick rate in 94.6 percent of cases, with the remaining incidences of the disease happening outside of the lungs in 5.4 percent of cases (EPTB). In this investigation, it was determined that the prevalence of PTB was higher than the prevalence of EPTB, which is in line with findings from earlier studies [9,10,11,12]. According to a study that was conducted in Iraqi Kurdistan [13], it was found that 63.5% of patients had extrapulmonary tuberculosis, whereas only 36.5% of patients had pulmonary tuberculosis. Extrapulmonary tuberculosis is a condition that affects a significant portion of people who have tuberculosis. There are a number of potential explanations for why the risk of extrapulmonary tuberculosis varies from person to person, several of these features include the inherent immunity of the host, the pathogenicity of various strains of Mycobacterium tuberculosis, and the mechanism of transmission. According to the findings of yet another Iranian study [14,15], patients diagnosed with extrapulmonary tuberculosis face a mortality risk that is 5.58 times higher than that of patients diagnosed with pulmonary tuberculosis.

The sputum smear test, on the other hand, can differentiate between two types of pulmonary tuberculosis, which are referred to as smear-positive and smear-negative pulmonary tuberculosis, respectively. In this experiment, 92.8 percent of the total sputum samples showed positive results for pulmonary tuberculosis on a smear test, the fact that it poses a danger of infecting others by droplet or airborne transmission [16,17] is one reason why it could be considered a source of community contagiousness. In addition, the findings demonstrated that patients with EPTB were more likely to have pleural infections than any other type of infection which is consistent with [9,18] in Iraq and [19,20] in Iran and Uzbekistan, other research has found that lymph nodes are to blame for nearly half of the cases of extrapulmonary tuberculosis (EPTB) in Iraqi Kurdistan [21] and in Turkey [22]. For instance, the genitourinary system and the skin were the two most common sites of infection in Hong Kong [23], but in the United States, bone and joint infections were more prevalent [24].

In this particular investigation, the M. tuberculosis cultivation ratio in clinical specimens was 14.9%, which was significantly higher than the percentage that could be determined with a straightforward visual examination (12.37 percent) Smear microscopy and Ziehl–Neelsen (ZN) staining are the two methods that are most commonly used to diagnose tuberculosis in underdeveloped countries (TB). This strategy does not require the utilization of advanced technology [25], which is among its many appealing features along with its low expense, great performance, and high degree of precision. It takes two hours to receive the results of the smear microscopy, but it is less sensitive than other testing procedures since it requires between 5000 and 10,000 bacteria in a milliliter of sputum to achieve a positive result. Consequently, it takes longer to get the results of the smear microscopy. Patients who have a positive culture but a negative sputum smear account for 13% of all cases of tuberculosis that are spread from patient to patient. When healthy persons come into close contact with TB suspects who have negative sputum cultures, the risk of getting MTB and developing active TB increases for both sets of individuals. The sensitivity of the test can be improved by following a routine in which sputum samples are collected first thing in the morning on three separate days in a row. As a result of its lack of sensitivity, sputum smear microscopy is unable to differentiate between Mycobacterium tuberculosis and Mycobacterium tuberculosis complex [26].

As a consequence of this, the Lowenstein–Jensen (LJ) medium for the growth of mycobacterium is utilized in tuberculosis diagnosis. This medium is recognized as the gold standard. This technique has a high degree of sensitivity, despite the fact that it can take many weeks to complete. Cultures of Mycobacterium TB grown in LJ medium are able to detect the presence of Mycobacterium tuberculosis in sputum samples when there are at least 10 viable bacilli per milliliter of the sample [27]. Regardless of the incidence of HIV, sputum induction was able to detect approximately 75% of culture-positive TB cases in both children and adults, according to the findings of a meta-analysis that included 17 separate research. However, the percentages estimated by individual investigations varied [28]. Researchers came to this conclusion after investigating the sensitivity of the sputum induction process. The generation of sputum was typically successful, with success rates ranging from 76.4 percent to 100 percent, and that side effects were uncommon and modest, according to a new comprehensive examination of 23 trials. This review came to the additional conclusion that the majority of adverse effects were controllable. When compared to culture, the range of sensitivity that can be achieved by the use of microscopy on induced sputum samples is 0% to 100%. When compared to nasopharyngeal aspiration and stomach lavage, sputum induction produced significantly larger yields [29].

Only three extrapulmonary specimens were found to have ZN stain, whereas six solid culture specimens were found to contain it. This difference is likely due to the fact that ZN stain is only present in extrapulmonary specimens. Even though pulmonary tuberculosis is the most common form of the disease in children, it is rarely tested for because children have trouble coughing up enough phlegm to get a satisfactory specimen for bacteriological verification. This is despite the fact that pulmonary tuberculosis is the most common form of the disease in children. In children, the risk of contracting pulmonary tuberculosis is significantly higher than the risk of contracting any of the other kinds of tuberculosis. In some instances, it has been reported that the organism spread through the bloodstream. This has been observed most frequently in infants and children under the age of five. The disease, which is often referred to as "military tuberculosis," can be spread through traumatic means and can affect any organ or tissue in the body, including the bones, brain, meninges, and stomach. The most prevalent indications of extrapulmonary tuberculosis in children are TB adenitis and TB pleural effusion. The extrapulmonary form of tuberculosis affects approximately 20–30% of all children who get the disease. If children with tuberculosis (TB) are not given the appropriate medication or if they develop a resistant strain of the disease, treatment may become substantially more challenging for these patients [30]. The AFB smear is quite specific for mycobacterium; nonetheless, it is essential to keep in mind that a positive AFB result might be caused by any non-tuberculous mycobacteria (NTM). The acid resistance of Nocardia and other actinomycetes is not as high as that of other actinomycetes, although these species are exceedingly uncommon. In the presence of a positive AFB smear, mycobacteria are almost invariably present; however, the presence of M. tuberculosis is not a prerequisite for the presence of mycobacteria [31]. Mycobacterium culture is, as of the time of this writing, the method that is both the most sensitive and trustworthy in terms of determining whether or not a current case of tuberculosis exists [32,31,33]. In the event that the smear test returns negative results for tuberculosis, it is imperative that a residual culture be performed. DNA fingerprinting and DST are two methods that can be utilized to identify culture isolates, these culture isolates can subsequently be utilized in molecular epidemiology research, culture can be performed on any type of sample, sputum is the most usually utilized material for diagnosing pulmonary tuberculosis [33], but culture can be performed on any sample also Mycobacteria can be found at a density of 10–100 viable cells per milliliter of material when culture procedures are used [34]. Because of the limited sensitivity of the direct smear method, it is quite

possible that live bacteria will be missed while using this method [35]. There is a higher probability of infection when acid-resistant bacteria are not tested for beforehand.

It is essential to detect pulmonary tuberculosis as early as possible and make an accurate diagnosis in order to cut down on the disease's rate of transmission and the severity of its long-term effects. The sputum smear microscopy test is the most common test that is used to determine whether or not a patient has tuberculosis of the lungs. This test is widely available in a variety of countries around the world. According to a recent study [36,37,38], the majority of tuberculosis patients with a positive smear test have high-quality microscopy of two consecutive sputum specimens. This percentage ranges from 95 to 98 percent. This finding was uncovered by scientists working in the United States. The World Health Organization (WHO) advises that only two sputum specimens should be collected on the same day, and this recommendation can only be obtained through the use of a high-grade acid-fast bacilli (AFB) microscopy. As a consequence of this, diagnostic costs can be brought down to a more manageable level by cutting down on the number of patients who withdraw from the procedure [38].

The greater number of tuberculosis cases in Baghdad may be attributable to the city's high population density and crowded conditions (close contact with patients), as well as the availability of more diagnostic methods facilities than in other governorates, which allowed for the recording of more tuberculosis cases among suspected TB patients and patients who were unable to travel to Baghdad and who went to the TB center in their governorate. According to the data presented in table 3, Baghdad has a significantly greater rate of TB patients than the national average. Because it is the only accredited laboratory in Iraq that is able to perform such tests, patients with suspected cases of tuberculosis bring their samples to the National Reference Laboratory (NRL) for identification and culture. This is done because the NRL is the only place in Iraq where such tests can be performed. The high incidence of tuberculosis in Baghdad can be attributed to a number of different factors. The most important of them are the growing population, the increasing urbanization, and the presence of people in enclosed areas for the majority of the day; all of these factors are contributing to an increase in the number of refugees and displaced persons who are living there. Due to the fact that HIV, smoking, diabetes, alcoholism, and malnutrition are all key risk factors and social determinants of tuberculosis (TB), the significance of these factors has come under increased scrutiny over the past several years [39] , the list is rounded out by overcrowding, the challenge of successfully navigating day-to-day life, and a lack of resources. Tuberculosis is the largest cause of mortality and disability in the developing world, as well as the primary source of HIV infection in the world's poorest countries, according to the World Health Organization (WHO) [40,41].

The findings presented in table (4) are in line with those found in studies [42] and research [43,9,44], which indicate that men have a risk of developing tuberculosis that is three times higher than that of women. According to the findings of a study that was carried out in Iran, males have a higher risk of developing pulmonary tuberculosis than females do [45]. Around the world, the proportion of males to females among newly diagnosed cases of tuberculosis (TB) that have a positive smear test is approximately two to one. This is not the case, however, in the country of Pakistan. The rate of tuberculosis cases reported by females is 20–30 percent higher than the rate of tuberculosis cases reported by males, and this difference remains even with increasing age [46]. As a point of interest, the disparity in mortality rates between men and women persists throughout all stages of life. Those who are HIV-positive and have a history of tuberculosis have a greater chance of passing away from the disease than those who are HIV-positive and have a history of tuberculosis but are male. Even more so for women in Africa, where a number of studies have discovered a fatality rate that is 20% higher for HIV/TB co-infected women than for co-infected men [47]. This is especially true for women in Africa. In nations like South Africa, the rate of HIV-associated tuberculosis fatalities among women who have both HIV and tuberculosis is also twenty percent greater. It is more common for males to develop tuberculosis than it is for women because men partake in more activities that take place outside of the home, such as smoking, consuming alcohol, and engaging in behaviors that are against the law. Among the many different examples, one that has a significant connection to these connections is deep pit mining [48].

In a manner comparable to this, the fact that women have connections with tuberculosis patients who are not members of their immediate family or household can be considered a risk factor [49]. It is possible that pregnant women who have both tuberculosis and HIV infection have an increased chance of dying from tuberculosis (TB) because of the medical problems that suppress the immune system during pregnancy [50] . Because of these chromosomal and hormonal variances, the host's response to an infection is different in males and females. This is because the immune system is regulated differently. Estradiol seems to be the hormone that is responsible for maintaining a healthy immune system, in contrast to progesterone and testosterone, both of which appear to inhibit the body's natural defenses against infectious diseases. Genetic variables, such as those con-

nected with a person's sex chromosomes, can also play a role in determining an individual's vulnerability to infection [51]. Research has shown that characteristics related to a person's line of work and their way of life play a significant part both in the risk of contracting an illness and in its treatment. When conducting research on tuberculosis, it is customarily a good idea to focus on those who fall into high-risk categories, such as those who are incarcerated, vaccinations against tuberculosis, on the other hand, offer protection to children against the illness [52].

As can be seen in the table (5), the incidence of tuberculosis in children under the age of 15 is quite low, which may be attributed to the widespread use of the BCG vaccine beginning in childhood. The effectiveness of immunization is highest in children but declines with increasing age [53]. The occurrence of these occurrences is far more likely to take place during puberty and the early years of young adulthood. There is a marked decrease in the number of cases among children and adolescents between the ages of 10 and 14. For the purpose of these evaluations, the most extensive tuberculosis surveillance dataset that is currently available was utilized: [54]. This dataset includes data from a diverse range of countries, many of which have a high endemicity of tuberculosis, as well as a range of epidemiological and topographical characteristics that are indicative of many different regions across the globe. According to the results of this survey, an overwhelming majority of respondents possess complete knowledge on the transmission of tuberculosis. Accurate information regarding the spread of tuberculosis has been found to be associated with a variety of other factors. These characteristics include being between the ages of 35 and 44, having completed secondary or higher education, coming from a wealthy family, being exposed to all three types of mass media, working in a professional, technical, or managerial capacity, and residing in an urban area. Other characteristics include being born into a family with a high level of education, and being exposed to all three types of mass media. The findings of the study indicated that there was a significant connection between the self-reported age of individuals in Malawi who received accurate information regarding the spread of tuberculosis and their actual age [55]. Those who were older than 25 years of age, in particular, had a better understanding of how tuberculosis was spread. Adults have a higher risk of contracting tuberculosis (TB) than children do. In our most recent study, we found that those between the ages of 25 and 34 had a positivity rate of 16.2 percent, those between the ages of 35 and 44 had a positivity rate of 30.6 percent, and those 55 and older had a positivity rate of 19.0 percent. Although tuberculosis is most frequently found in adult males, it is possible for people of any age to become infected with the disease [56]. According to a report published by the World Health Organization, the prevalence of tuberculosis in Iraq has been steadily declining across a wide variety of age groups [6].

5. Conclusions

In our results suggest that cultivation dependence most be more sensitive than direct method. On the other hands require more attention in TB control programs to helped patients prevented infection and healing.

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Conflicts of Interest: None

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