Prevalence of Pulmonary Tuberculosis Among Suspected Cases Referred to the TB Centre in Basrah

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***Abstract*:** Pulmonary tuberculosis remains a major global health problem and is particularly prevalent in developing countries, where it continues to cause significant morbidity and mortality. Iraq carries a high burden of tuberculosis, with incidence expected to rise due to factors such as inadequate control programs, poverty, population growth, and the emergence of multidrug-resistant strains. This study aimed to estimate the prevalence of pulmonary tuberculosis among suspected patients referred to the Chest and Respiratory Disease Consultation Clinic (CRDCC) in Basrah, to assess the most frequent referral sites, their diagnostic yield, and to describe the main characteristics of referred patients. A descriptive cross-sectional study was conducted from January to June 2014, including 492 patients referred to the CRDCC. Data were collected through structured interviews and review of laboratory investigations. The results showed that the majority of patients were female (52.4%), married, urban residents, with a mean age of 40.9 years. Most were unskilled workers with low education levels, and passive tobacco smoke exposure was common. Private clinics accounted for over one-third of referrals, but most cases were ultimately negative for tuberculosis (88.2%). Only 11.8% were diagnosed with active tuberculosis, of which 7.5% were new and 4.3% relapse cases. The majority of referrals (88.4%) were based on symptoms, with multiple symptoms being more common than single complaints. Diagnosis was most frequently confirmed by a combination of two tests (75.9%), which also excluded tuberculosis in most negative cases (79.5%). The findings highlight the need for improved awareness among healthcare providers and the public, as well as targeted screening programs for high-risk groups, supported by broader national studies.

***Index Terms*:** Pulmonary tuberculosis, Basrah, referral sites, prevalence, risk factors, diagnostic methods

INTRODUCTION

Tuberculosis (TB) is a chronic necrotizing infection caused by Mycobacterium tuberculosis (MTB), transmitted mainly through airborne droplets when infected individuals cough, sneeze, or speak. Its hallmark is the ability to persist asymptomatically as latent TB infection (LTBI). While most infected people maintain latency through cellular immunity, about 10% progress to active disease (1). TB remains a major global health issue, ranking as the second leading cause of death from infectious diseases after HIV/AIDS (2,3). It is the greatest killer of women during childbearing years (1). Global prevalence has been declining since 2005, and incidence since 2002 (4). China achieved an 80% mortality reduction between 1990–2010 (5). In 2010, there were 8.8 million new TB cases and 1.2–1.45 million deaths, mostly in developing countries; 0.35 million deaths occurred in those co-infected with HIV (6,7). Roughly one-third of the global population carries MTB, with new infections in 1% yearly (8). In 2006, TB accounted for 9.2 million new cases, 14.4 million prevalent cases, and 1.5 million deaths, disproportionately affecting poorer nations, especially in Africa (due to HIV) and the former Soviet states (due to weak healthcare systems) (9).

In the U.S., 4–6% of the population harbor LTBI, with historic increases from 1985–1992 linked to HIV, immigration, and weakened public health systems. Strengthened programs subsequently reduced cases to 14,571 in 2004 (10). By 2012, global estimates decreased to 8.6 million chronic cases (11). Iraq has a high prevalence (200/100,000), worsened by conflict, which disrupted TB care. In the 1990s, incidence increased drastically (12). Poverty, poor awareness, stigma, and limited healthcare access exacerbate Iraq's TB burden, particularly in urban slums with poorly equipped health services (13).

TB is caused by M. tuberculosis, a slow-growing aerobic bacillus with a lipid-rich cell wall responsible for its clinical features (14,15). It stains weakly Gram-positive due to mycolic acid

content (16,17), survives in dry conditions, and can be cultured in laboratories despite requiring host cells in nature (18). Related pathogenic species include M. bovis, M. africanum, M. canetti, and M. microti. M. africanum is mainly confined to parts of Africa (19).

Several conditions increase TB susceptibility. Globally, HIV is the strongest risk factor, with 13% of TB patients co-infected, especially in sub-Saharan Africa (20). While 5–10% of HIV-negative individuals develop TB, up to 30% of HIV-positive do (21). Other risks include overcrowding, malnutrition (22), injection drug use, institutional living (23), marginalized communities, chronic lung disease such as silicosis (24), smoking (25), alcoholism, diabetes (26), and immunosuppressive medications like corticosteroids or infliximab (27). TB spreads when infectious droplets (0.5–5 μm) are expelled, with as few as 10 bacilli sufficient to cause infection (28,29). Close contact yields a 22% infection risk, and untreated cases may infect 10–15 people annually (30,31). Only active cases transmit disease. Transmission likelihood depends on droplet load, ventilation, exposure time, strain virulence, and host immunity (32). Effective treatment renders patients non-infectious within two weeks (30). Newly infected individuals typically take 3–4 weeks to become contagious (33).

TB primarily affects the lungs (PTB), though extrapulmonary TB (EXTB) also occurs (3). General symptoms include fever, night sweats, anorexia, weight loss, and fatigue (6). Primary TB results from inhaled droplets, and may present with parenchymal disease, lymphadenopathy, effusion, or miliary spread (34–36). About 90% of active cases involve the lungs, with chronic cough, chest pain, and sometimes hemoptysis. Up to 25% remain asymptomatic (22,37). Post-primary TB arises from LTBI reactivation, leading to progressive lung damage and scarring if untreated (38).

Diagnosing active TB is challenging, especially in immunocompromised patients (39,40). Clinical suspicion arises with chronic cough, lymphadenopathy, pleural effusion, or persistent constitutional symptoms. Chest X-rays often show upper lobe infiltrates or cavities but may be normal in HIV patients (41). Sputum smear microscopy remains the primary diagnostic tool, with 20–80% sensitivity depending on methods (42).

Definitive diagnosis requires MTB identification in clinical samples, but cultures take 2–6 weeks (44,45). Rapid alternatives include nucleic acid amplification, adenosine deaminase, and the Xpert MTB/RIF assay, which detects TB and rifampin resistance within 2 hours, with higher sensitivity than smear microscopy (39,46–49). Latent TB, affecting 90% of infected individuals, is asymptomatic but carries 5–15% lifetime risk of reactivation (46). Diagnosis relies on tuberculin skin tests (TST) or interferon-γ release assays (IGRAs). TST is widely used but limited in specificity, while IGRAs offer greater accuracy, especially in BCG-vaccinated populations (50,51).

TB prevention hinges on early detection, isolation, and effective treatment of infectious cases, as well as treatment of LTBI in high-risk groups (52). Additional measures include contact tracing, healthy lifestyles, and BCG vaccination. Derived from attenuated M. bovis, BCG provides up to 80% protection for 15 years and is recommended at birth in high-prevalence countries (52). However, variable efficacy (0–80%) and interference with TST limit its use in the U.S. (53,54). Immunocompromised children, especially HIV-positive, should not receive BCG due to risk of disseminated disease (53,54).

Without strengthening TB care, especially for vulnerable populations, Iraq risks losing control over TB and failing global targets set by the Millennium Development Goals and Stop TB Partnership (13). Decades of conflict have worsened incidence, making local research essential. This study aims to assess pulmonary TB prevalence among suspected patients referred to the CRDCC in Basrah and to identify referral patterns, common sources of referrals, and causes for referral and to describe the characteristics of referred patients and prevalence of TB risk factors.

METHODS

This descriptive cross-sectional epidemiological study was conducted to estimate the prevalence of pulmonary tuberculosis (TB) among suspected patients referred to the Chest and Respiratory Disease Consultation Clinic (CRDCC) in Basrah governorate. Additional objectives were to identify the referral sources and their diagnostic yield, as well as to describe the characteristics and risk factors of the attending patients. Approval to conduct the study was obtained from the Ministry of Health. The study took place at the CRDCC, which serves as the central facility in Basrah for TB diagnosis, treatment initiation, and follow-up care, providing both laboratory investigations and therapeutic planning. The study period extended for six months, from January to June.

A pilot study involving 25 referred patients was undertaken to test the feasibility of the questionnaire, time requirements, anticipated challenges, and sample size. Based on the pilot, modifications were made to the questionnaire, and an estimated sample of 480–528 cases was projected. Patients attending the CRDCC on two working days per week were included consecutively after providing consent. The refusal rate was zero. Data collection involved direct interviews using a structured questionnaire and review of laboratory and radiological investigations, including

sputum for acid-fast bacilli (AFB), GeneXpert testing, and chest radiographs. The diagnosis of pulmonary TB, whether primary or recurrent, was based on clinical presentation together with laboratory and radiological findings. Exclusion criteria were patients with extrapulmonary TB and those attending solely for follow-up while already on anti-TB treatment.

The questionnaire covered four domains: (1) demographic characteristics (age, gender, residence, marital status), (2) socioeconomic characteristics including occupation, education, income (assessed by proxy indicators such as housing, car ownership, and household assets), family size, and crowding index, (3) risk factors such as family history of TB, smoking status, contact with TB patients, chronic disease, immunosuppressive therapy, history of previous TB or BCG vaccination, and exposure to domestic animals, and (4) referral information including source of referral, reasons for referral, and referral outcomes. Smoking history was classified as current smoker, ex-smoker, non-smoker, or passive smoker, with details recorded on type, quantity, and duration. Socioeconomic status was categorized into good, middle, and poor based on combined indicators of occupation, education, and income. Crowding index was calculated as the number of individuals per room, with a value ≥5 considered overcrowded. Chronic disease status was defined according to the U.S. National Center for Health Statistics criteria, and vaccination history was confirmed through presence of a BCG scar. Clinical information collected included symptoms such as cough, fever, dyspnea, weight loss, chest pain, and hemoptysis. Diagnostic confirmation of TB was based on clinical findings supported by chest X-ray, sputum microscopy for AFB, and the Xpert MTB/RIF assay. Positive cases were further classified as new or relapsed, based on WHO definitions. Referral sources included private clinics, primary healthcare centers, hospitals, self-referrals, occupational health units, and prison screening programs. Reasons for referral were categorized into symptoms, TB contact tracing, or suspicion based on clinical or laboratory findings. Outcomes of referral were recorded as TB-positive or TB-negative (55 – 60).

Data were entered and analyzed using SPSS version 17. Results were presented in simple explanatory tables with descriptive statistics.

RESULTS

This table summarizes the demographic characteristics of the study population, including age, gender, marital status, and place of residence.

Table (3.1) Characteristic of the study population (Age, Gender, Marital status and Residency distributions of the study population)

Age (years)	Frequency	Percent
<10	3	0.6%
10–19	55	11.2%
20–29	75	15.2%
30–39	102	20.7%
40–49	92	18.7%
50–59	62	12.6%
≥60	103	21.0%
Total	492	100%
Mean 40.96		S.D 17
Gender	Frequency	Percent
Male	234	47.6%
Female	258	52.4%
Total	492	100%
Marital status	Frequency	Percent
Single	106	21.5%
Married	359	73.0%
Divorced	5	1.0%
Widowed	22	4.5%
Total	492	100%
Residency	Frequency	Percent
Urban	316	64.2%
Rural	176	35.8%
Total	492	100%

This table summarizes the Socio-economic status of study population.

Table (3.2) Socio-economic status of study population (Occupation, Education, Crowding index)

Occupation	Frequency	Percent
High professional	19	3.9%
Lower professional	99	20.1%
Unskilled worker	374	76.0%
Total	492	100%
Education	Frequency	Percent
Illiterate	55	11.2%
Read and write	19	3.9%
Primary	93	18.9%
Intermediate	135	27.4%
Secondary	75	15.2%
Institute and college	113	23.0%
High degree	2	0.4%
Total	492	100%
Crowding index	Frequency	Percent
<5	443	90.0%
≥5	49	10.0%

Total	492	100%

This table presents the prevalence of comorbidities among the study population.

Table (3.3) Co-morbidity

Co-morbidity	Frequency	Percent
Chronic NCD	56	11.4%
Previous HX of TB	15	3.0%
Immune-compromise disease	1	0.2%
No co-morbidity	420	85.4%
Total	492	100%

This table illustrates the history of smoking in the study population, including active, passive, and ex-smokers.

Table (3.4) Smoking history of study population

Smoking history	Frequency	Percent
Active	88	17.9%
Passive	253	51.4%
Ex-smoker	40	8.1%
No smoking	111	22.6%
Total	492	100%

This table summarizes the family history of tuberculosis among the study population.

Table (3.5) Family history of study population

Family history	Frequency	Percent
Yes	41	8.3%
No	451	91.7%
Total	492	100%

This table summarizes the Contact history of tuberculosis among the study population.

Table (3.6) Contact history of study population

Contact with TB	Frequency	Percent
Yes	49	10.0%
No	443	90.0%
Total	492	100%

This table presents BCG vaccination history and presence of vaccination scar among the study population.

Table (3.7) BCG HX and BCG scar

BCG scar	Frequency	Percent
Positive	150	92.6%
Negative	12	7.4%
Total	162	100%
BCG HX	Frequency	Percent
Positive	162	32.9%
Negative	330	67.1%
Total	492	100%

This table shows the referral sites of patients attending the CRDCC.

Table (3.8) Referral site of study population to the CRDCC

Referral site	Frequency	Percent
Private clinic	163	33.1%
PHC	62	12.6%
Hospital	107	21.7%
Self-referral	158	32.2%
Prison screening	1	0.2%
Occupational health	1	0.2%
Total	492	100%

This table shows the result of cases referred to CRDCC.

Table (3.9) The result of cases referred to CRDCC

Referral result	Frequency	Percent
TB-negative	434	88.2%
TB-positive	58	11.8%
Total	492	100%

This table differentiates between newly diagnosed and relapse TB cases.

Table (3.10) New and relapse case

Referral result	Frequency	Percent
New positive case	37	7.5%
Relapse	21	4.3%
Negative case	434	88.2%
Total	492	100%

This table presents the main causes of referral to the CRDCC.

Table (3.11) Causes of referral

Cause of referral	Frequency	Percent
Symptomatic	435	88.4%
Suspected	47	9.6%

TB contact screening	10	2.0%
Total	492	100%

This table presents clinical presentation of study population

Table (3.12) Clinical Presentation of study population

Clinical presenting	Frequency	Percent
Cough	168	38.6%
Hemoptysis	6	1.4%
Fever	6	1.4%
Combination of symptoms	255	58.6%
Total	435	100%

This table presents the diagnostic method for positive cases

Table (3.13) Diagnostic method for positive cases

Diagnostic method	Positive cases	Percent
Sputum AFB	3	5.2%
GeneXpert	7	12.0%
CXR	0	0%
Combination of 2 tests	44	75.9%
Combination of 3 tests	4	6.9%
Total	58	100%

This table presents the exclusive method for negative cases

Table (3.14) Exclusive method for negative cases

Diagnostic method	Negative cases	Percent
Sputum AFB	37	8.5%
GeneXpert	19	4.4%
CXR	20	4.6%
Combination of 2 tests	345	79.5%
Combination of 3 tests	13	3.0%
Total	434	100%

This table presents the association between referral sites and age of the study population.

Table (3.15) Association between Referral site and Age of study population

Referral site	<10 (n,%)	10–19 (n,%)	20–29 (n,%)	30–39 (n,%)	40–49 (n, %)	50–59 (n,%)	≥60 (n,%)	Total
Private clinic	1, 0.6%	17, 10.4%	25, 15.3%	37, 22.7%	24, 14.7%	23, 14.1%	36, 22.2%	163
PHC	0, 0%	7, 11.3%	12, 19.4%	18, 29.0%	11, 17.7%	9, 14.5%	5, 8.1%	62
Hospital	2, 1.9%	10, 9.3%	19, 17.8%	19, 17.8%	24, 22.4%	10, 9.3%	23, 21.5%	107
Self-referral	0, 0%	21, 13.3%	19, 12.0%	28, 17.7%	32, 20.2%	20, 12.7%	38, 24.1%	158
Prison screening	0, 0%	0, 0%	0, 0%	0, 0%	1, 100%	0, 0%	0, 0%	1
Occupational health	0, 0%	0, 0%	0, 0%	0, 0%	0, 0%	0, 0%	1, 100%	1

This table shows the association between referral sites and gender of the study population.

Table (3.16) Association between Referral site and Gender of study population

Referral site	Female (n)	Female (%)	Male (n)	Male (%)	Total
Private clinic	92	35.6%	71	30.3%	163
PHC	34	13.2%	28	12.0%	62
Hospital	57	22.1%	50	21.4%	107
Self-referral	75	29.1%	83	35.5%	158
Prison screening	0	0%	1	0.4%	1
Occupation health	0	0%	1	0.4%	1
Total	258	100%	234	100%	492

This table shows the association between Referral site and Residency of study population

Table (3.17) Association between Referral site and Residency of study population

Referral site	Rural (n)	Rural (%)	Urban (n)	Urban (%)	Total
Private clinic	61	34.7%	102	32.3%	163
PHC	21	11.9%	41	13.0%	62
Hospital	40	22.7%	67	21.2%	107
Self-referral	53	30.1%	105	33.2%	158
Prison screening	0	0%	1	0.3%	1
Occupation health	1	0.6%	0	0%	1
Total	176	100%	316	100%	492

This table shows the Association between Referral site and Occupation

Table (3.18) Association between Referral site and Occupation

Referral site	High professional (n,%)	Lower professional (n,%)	Unskilled worker (n,%)	Total (n)
Private clinic	3, 15.8%	42, 42.4%	118, 31.6%	163
PHC	4, 21.0%	7, 7.0%	51, 13.6%	62
Hospital	3, 15.8%	25, 25.3%	79, 21.1%	107
Self-Referral	9, 47.4%	25, 25.3%	124, 33.1%	158
Prison screening	0, 0%	0, 0%	1, 0.3%	1
Occupation health	0, 0%	0, 0%	1, 0.3%	1
Total	19, 100%	99, 100%	374, 100%	492

This table shows the Association between Referral Sites and Education

Table (3.19) Association between Referral Sites and Education

Referral site	High Degree (n,%)	Institute & College (n,%)	Secondary (n,%)	Intermediate (n,%)	Primary (n,%)	Read & write (n,%)	Illiterate (n,%)	Total (n)
Private clinic	1, 50%	48, 42.5%	21, 28%	43, 31.9%	22, 23.7%	7, 36.8%	21, 38.2%	163
PHC	1, 50%	5, 4.5%	8, 10.7%	20, 14.8%	19, 20.4%	2, 10.6%	7, 12.7%	62
Hospital	0, 0%	30, 26.5%	18, 24%	24, 17.8%	19, 20.4%	5, 26.3%	11, 20%	107
Self referral	0, 0%	30, 26.5%	27, 36%	48, 35.5%	32, 34.4%	5, 26.3%	16, 29.1%	158
Prison screening	0, 0%	0, 0%	1, 1.3%	0, 0%	0, 0%	0, 0%	0, 0%	1
Occupation health	0, 0%	0, 0%	0, 0%	0, 0%	1, 1.1%	0, 0%	0, 0%	1
Total	2	113	75	135	93	19	55	492

This table shows the Association between Referral site and Referral result of study population

Table (3.20) Association between Referral site and Referral result of study population

Referral site	TB +ve (n)	TB +ve (%)	TB –ve (n)	TB –ve (%)	Total (n)
Private clinic	32	19.6%	131	80.4%	163
PHC	4	6.5%	58	93.5%	62
Hospital	9	8.4%	98	91.6%	107
Self referral	12	7.6%	146	92.4%	158
Prison screening	1	100%	0	0%	1
Occupation health	0	0%	1	100%	1
Total	58		434		492

This table shows the Association between Referral sites and cause of referral of study population

Table (3.21) Association between Referral site and cause of referral of study population

Referral site	TB contact screening (n,%)	Suspected (n,%)	Symptomatic (n,%)	Total (n)
Private clinic	5, 3.1%	11, 6.7%	147, 90.2%	163
PHC	1, 1.6%	6, 9.7%	55, 88.7%	62
Hospital	2, 1.9%	7, 6.5%	98, 91.6%	107
Self-referral	2, 1.3%	23, 14.5%	133, 84.2%	158
Prison screening	0, 0%	0, 0%	1, 100%	1
Occupation health	0, 0%	0, 0%	1, 100%	1
Total	10	47	435	492

This table presents the association between referral sites and new versus relapse TB cases.

Table (3.22) Association between Referral site and new and relapse case of study population

Referral site	New case (n,%)	Relapse case (n,%)
Private clinic	23, 62.2%	6, 28.6%
PHC	1, 2.7%	5, 23.8%
Hospital	9, 24.3%	1, 4.7%
Self-referral	3, 8.1%	9, 42.9%
Prison screening	1, 2.7%	0, 0%
Total	37, 100%	21, 100%

DISCUSSION

Approximately one-third of the world's population is infected with TB (61). In most cases, the immune system controls the bacteria, keeping individuals asymptomatic and non-contagious (62). About 10% progress from latent infection to active disease, with half of these untreated cases resulting in death. TB disease and mortality are generally lower in Western Europe and among populations of European ancestry in the Americas, largely due to socioeconomic advantages such as income, education, and healthcare access (63,64). Risk is amplified by crowding, malnutrition, and co-morbidities. This study aimed to assess pulmonary TB prevalence among suspected cases referred to the

CRDCC in Basrah, to evaluate referral site contributions, and to describe patient characteristics. A descriptive cross-sectional design was adopted, with data collected from 492 patients between January and June 2014.

Age distribution showed 21% of patients were ≥60 years and 20.7% were 30–39 years, with a mean of 40.9 ± 17 years. This is consistent with a study in Bane (Kurdistan), where 70% were aged 15–65, 25% >65, and 4% <15 (65). However, findings differ from Bisseau (Africa), where TB incidence increased significantly with age due to declining immunity or comorbidity (66). Most referrals from private clinics and PHCs were 30–39 years, hospital referrals were mainly 10–19 years, while self-referrals were largely ≥60 years. Females predominated (52.4%, ratio 0.9:1), similar to Iran (68), but contrasting Turkey, where 67% were male (67). Most females were referred from private clinics, while males were more likely to attend directly. Urban residency accounted for 64.2%, consistent with findings in Kurdistan (65). Rural referrals came mostly from private clinics and hospitals, while urban cases frequently self-referred. Marital status showed 73% married and only 1% divorced, contrasting with Iranian data showing no significant association (69) and a Mexican study suggesting marriage has a protective effect, possibly through spousal support and better adherence (70–72).

Regarding risk factors, 76% of patients were unskilled workers and only 3.9% were high professionals, aligning with Turkey where laborers, farmers, drivers, and machine operators comprised 61% (67). High professionals mostly self-referred, while lower professionals often attended private clinics. Educational attainment was predominantly intermediate level (27.4%) with very few highly educated (0.4%). This reflects findings in Basrah showing TB is more common in those of lower educational status (73). Illiterate and low-educated groups were more likely to be referred from private clinics, while secondary and intermediate education groups often self-referred. Crowding did not show an association; 90% lived in non-crowded homes, agreeing with Basrah (74), but differing from Canadian studies linking overcrowding to TB (75). Chronic disease was present in 11.4% of cases, especially diabetes mellitus, supporting evidence from Sub-Saharan Africa showing DM increases TB risk and severity (76,77). A history of TB contact was reported in 10% of patients, similar to U.S. reports of 1.5–3% (78), reflecting effective isolation and preventive interventions. Smoking exposure was common, with 69.3% having active or passive history, echoing Indian data attributing 50% of TB deaths to smoking (61,79). Most patients (67%) were unvaccinated with BCG, while 32.9% reported vaccination; among them, 92.6% had a scar, but 7.4% lacked one, suggesting vaccine failure. A Turkish study demonstrated BCG's protective role (80). Family history was reported by 8.3%, contrasting with a Hong Kong study that found a significant association (81).

Diagnostic methods showed that most positive cases (75.9%) were confirmed using two combined tests, while only 5.2% were diagnosed by sputum alone. This contrasts with Babel, Iraq, where 65% were smear-positive (82), and Kurdistan, where smear-positive detection was low (65). GeneXpert identified 12% of cases, supporting its high sensitivity and specificity (49). Chest X-ray alone did not establish diagnosis. Overall, 11.8% of referrals were TB-positive, while 88.2% were negative. Of the positives, 63.8% were new and 36.2% were relapses, possibly due to poor treatment adherence, drug resistance, or host factors. This differs from Japan, where relapse declined steadily from 39% in 1977 to 7.5% in 2007.

Private clinics accounted for 33.1% of referrals, followed by self-referral (32.1%), hospitals (21.7%), PHCs (12.6%), and minimal contributions from prisons and occupational health. Most new cases were from private clinics (62.2%), followed by hospitals (24.3%), self-referral (8.1%), and PHCs (2.7%). Relapsed cases were predominantly self-referred (42.9%), followed by private clinics (28.6%), PHCs (23.8%), and hospitals (4.7%) (83). Private clinics were more effective in identifying true TB, with 19.6% positive yield compared to 8.4% from hospitals, 7.6% from self-referrals, and 6.5% from PHCs, while prison referrals, though rare, were 100% positive. Most referrals from PHCs and hospitals were negative, reflecting limited diagnostic facilities and variable

clinical skills. Patients referred from private clinics often had prior sputum or chest X-ray results, facilitating more accurate referrals.

CONCLUSIONS AND RECOMMENDATIONS

This study showed that most patients referred to the CRDCC were aged ≥60 or 30–39 years, predominantly female, married, and from urban areas, with unskilled workers, those with intermediate education, and smokers forming the largest groups. Private clinics were the most common referral source, followed by self-referrals, and more than 80% of cases were referred for symptoms, with most presenting with multiple complaints. While over three-quarters of positive cases were confirmed through combined diagnostic methods, the majority of referrals (88.2%) were negative, and only 11.8% were diagnosed with TB. To improve outcomes, strengthening knowledge and practice of health professionals through training, clear TB management guidelines, and enhanced health education for the public is essential. Increasing awareness of risk factors, reducing stigma, ensuring routine BCG vaccination, and expanding access through mobile clinics and targeted screening programs are also recommended to improve case detection and patient adherence in Iraq.

FUNDING AND FINANCIAL SUPPORT

The study funded by the researchers.

DATA CONFIDENTIALITY AND STORAGE

The data will be processed with a higher degree of confidentiality and privacy.

CONFLICTS OF INTEREST

The researchers did not report any conflicts of interest.

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