

## EVALUATION OF THE REFERRAL SYSTEM OF SUSPECTED TUBERCULOSIS PATIENTS IN PRIMARY HEALTH CARE CENTERS BAGHDAD, IRAQ

Sajida Rashid Kaittan<sup>1\*</sup>, Huda Ibrahim Asal<sup>2</sup> and Suhad Falah Hassan<sup>3</sup>

<sup>1</sup>Baghdad Al-Karkh Health Department, Baghdad, Iraq.

<sup>2</sup>Board Community Medicine, Department General Directorate of Public Health / MOH. Baghdad, Iraq.

<sup>3</sup>Baghdad Al-Karkh Public Health Department, Baghdad, Iraq.

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\*Corresponding Author: Sajida Rashid Kaittan

Baghdad Al-Karkh Health Department, Baghdad, Iraq.

### ABSTRACT

**Background:** Tuberculosis (TB) remains a leading cause of death worldwide, and Iraq is among the high TB burden countries in the Eastern Mediterranean Region. The estimated TB incidence in Iraq is 45 cases per 100,000, with a mortality rate of 3.2 per 100,000 annually. Delayed diagnosis increases community transmission. The Iraqi National TB Control Program (NTP) emphasizes early TB case detection through referrals from primary healthcare centers (PHCCs). Any deficiencies in this referral system impact TB control efforts. Objectives: This study aimed to assess the effectiveness of the TB suspect referral system in PHCCs in Baghdad by examining the knowledge, attitude, and practice of PHCC managers, physicians, and district TB coordinators (DTCs), and to identify factors affecting the system's performance. **Methodology:** A health system research study was conducted in 75 randomly selected PHCCs across 15 health districts in Baghdad from March to November 2023, involving 406 physicians, 75 managers, and 17 DTCs. Data were collected via interviews using a self-administered questionnaire and analyzed with SPSS version 20. **Results:** The referral rate of TB suspects from PHCCs to DTCs was 26.4%. Only 12.5% of physicians knew TB symptoms, 5.9% confirmed diagnoses using sputum, and 13.5% were trained on TB control. Around 94% of physicians stated the need for training. Only 9.3% of PHCCs met referral targets. Among DTCs, 88.2% were supported by NTP, but only half visited PHCCs quarterly. **Conclusions:** There is a significant knowledge gap among PHCC practitioners regarding TB control and referrals. Training programs targeting these gaps are essential to improve the referral system and support NTP goals.

**KEYWORDS:** Evaluation, Referral System, Tuberculosis, Primary Health Care, Baghdad.

### INTRODUCTION

Tuberculosis (TB) is a significant global health issue, infecting one-third of the world's population and causing millions of deaths annually, particularly in low-income countries.<sup>[1]</sup> TB disproportionately affects young adults in developing regions, with around 95% of TB deaths occurring in these areas, and 8.8 million new cases annually.<sup>[2-5]</sup> In response to the escalating epidemic, the World Health Assembly (WHA) declared TB a global public health emergency in 1991. In 1994, the Directly Observed Therapy-Short Course (DOTS) strategy was introduced to enhance TB control, emphasizing passive case detection, diagnosis via smear microscopy, and timely treatment.<sup>[6]</sup> Early detection is critical, as it limits TB transmission and improves treatment outcomes.<sup>[6]</sup> In Iraq, TB is a major public health concern, with an estimated annual incidence, prevalence, and mortality rates of 45, 74, and 3.2 cases per 100,000 people,

respectively.<sup>[7]</sup> However, TB control is hindered by a low detection rate (60% in 2011)<sup>[7]</sup> Poor medical practices, such as improper diagnosis and treatment, exacerbate the spread of TB, contribute to multi-drug-resistant TB (MDR-TB), and impose economic burdens on patients and the healthcare system.<sup>[8]</sup> Sputum smear microscopy and standardized treatment regimens are underutilized, while unnecessary interventions are overused, leading to further financial strain.<sup>[8]</sup> To improve TB control, it is essential that healthcare providers adopt international standards, and patients are educated to use available services appropriately. The DOTS program has proven effective in improving healthcare management, technical skills, and reporting systems.<sup>[8,9]</sup> An effective referral system is crucial to ensuring early TB diagnosis and treatment, as untreated patients can infect up to 20 contacts throughout the course of their illness.<sup>[10]</sup> Primary healthcare (PHC) providers play a key role in detecting

TB suspects and referring them for treatment, helping to increase case detection rates (CDR) and reduce TB-related morbidity and mortality<sup>[11]</sup> However, inadequate infrastructure and resource shortages in PHC centers limit their ability to provide high-quality TB services. Improving PHC capacity, enhancing social mobilization, and providing financial and technical support could significantly strengthen TB care.<sup>[12]</sup> Enhanced detection of TB cases is vital to achieving TB control and elimination, as TB is curable in 95% of cases when timely diagnosis and treatment are provided.<sup>[13]</sup> Aim of the stud to assess the function of TB suspected referral system in primary health care centers (PHCCs) in Baghdad Governorate.

## METHOD

This health system research aimed to evaluate the referral system for suspected tuberculosis (TB) cases at the level of primary health care (PHC) facilities in Baghdad through interviews with physicians and review of PHC-related registers. Data collection was conducted at selected primary health care centers (PHCCs) and district TB coordinating units (DTCUs) in Baghdad, which is divided into Karkh and Resafa. Each PHC district includes a district TB coordinator (DTC) and several PHCCs. All DTCs were included in the study, while a random sample of PHCCs was selected. Participants included physicians, PHCC managers, and district TB coordinators in the selected settings. Eligible participants were informed about the study and those who consented were included. Inclusion: Physicians in selected settings, PHCC managers, and DTCs in Baghdad. Exclusion: PHC staff other than physicians or PHCC managers, and those who refused to participate. DTCs were selected through comprehensive sampling, while PHCCs were selected using cluster sampling, with 25% of PHCCs chosen randomly from each district. A

sample size of 141 physicians was estimated, with approximately two PHCCs per district selected. a. Data was collected via structured interviews with eligible participants and review of registers in DTCUs and PHCCs. b. Data collection occurred four days a week, four hours a day, from September 1, 2022, to May 31, 2023. c. Three structured questionnaires and two checklists were used, developed by the researcher and reviewed by specialists. The questionnaires assessed knowledge, practices, and administrative processes related to TB control. Questionnaires were pretested with a small sample of PHCC physicians, managers, and DTCs. Interviews were conducted by the same interviewer to minimize bias, and data entry was cross-checked for accuracy. Data was entered into SPSS version 20 and analyzed descriptively, with frequencies and summary statistics for responses to questionnaires and checklists. **Communication:** Approvals were obtained from Baghdad Health Directorates and relevant committees to conduct the study. Ethical approvals were obtained, and participant confidentiality was assured. Verbal consent was a prerequisite for participation.

## RESULTS

PHCC Physicians were 170. Their age varied from 25 to 62 years with average of 39.8 ( $\pm$  8.5) years and around one fifth (21.8%) was older than 45 years (table 1). Male physicians were 77 (45.3%). Majority (67.6%) of physicians were general practitioners (GP). Family physicians constituted 14.1% of the sample, 4.1% were internists, while other specializations contributed to the remaining 14.1%. Work experience in primary health care (PHC) varied from 1-33 years; average 8.8 ( $\pm$  6.5) years. Around two thirds (65.9%) of physicians had experience exceeded five years, one fifth (21.2%) had experience between 2-5 years and 12.9% had less than one-year experience (table 1).

**Table 1: Personal characteristics of PHCC physicians enrolled in the study.**

Variables	Category	N(170)	%
Age (year)	25-45	133	78.2%
	46-65	37	21.8%
	Mean $\pm$ SD:39.8 $\pm$ 8.5 Min-Max Age Group25-62		
Sex	Mal	77	45.3%
	Female	93	54.7%
Specialty	General Practitioner	115	67.6%
	Family Medicine	24	14.1%
	Internal Medicine	7	4.1%
	Others	24	14.1%
Years of work in PHCC	Up to 1 year	22	12.9%
	2-5 years	36	21.2%
	>5 years	112	65.9%
	Mean $\pm$ SD:8.8 $\pm$ 6.5 Min-Max Group1-33		

Only 12.4% of physicians working in PHCC had correctly identified features that bring suspicion to tuberculosis disease in general, but none of them (0.0%) had correctly identified when to suspect a case of pulmonary tuberculosis (table 2). The proportions of physicians who knew when pulmonary TB (PTB) patient will not be contagious after starting anti-TB treatment and those who knew the best method to confirm PTB were 4.1% and 5.9%, respectively. Concerning awareness about national TB control program (NTP), about 78% of physicians had heard about NTP, less than half of them (43.5%) stated that NTP guideline is available and a small proportion of them (13.5%) trained on TB control, and only 8.8% identified all the first line anti-TB drugs. Around 37% of physicians had met district TB coordinator (DTC) during his visits to PHCC. About one third (32.4%) of physicians do not know there are official directions to refer TB suspects to district TB coordinator unit (DTCU) and 20% of physicians were not directed to refer TB suspects to DTCU. Only 18.8% of physicians know the target of TB suspect referral out of PHCC visiting patients. Though the majority of physician (92.9%) would have referred cases to the correct facilities that belong to NTP; still some referred to non-TB specialized care givers including private practitioners (2.4%). Physicians attributed non-referral of TB suspects to NTP facilities to non-awareness of

physicians about NTP (35.3%), refuse or not believe in NTP (11.8%). About 80% of physicians will/would not correctly advise TB suspect to adhere to NTP in diagnosis or treatment upon their referral. Documentation of referred TB suspects in PHCCs is stated to be in special TB suspect register by 34.7% of PHCC physicians, in general register of referral 27.1%, while 11.2% of physicians stated there is no documentation, and more than one fourth (27.1%) of them do not know if there is documentation of referred suspects (table 2). Regarding tackling the responsibility of TB control at PHCC level, it was found that 12.9% of physicians stated there is a physician in the PHCC allocated exclusively for TB control, 54.1% stated there is a physician assigned for TB control in addition to other PHC responsibilities, 7.1% of physicians stated that there is no physician allocated for TB control in the PHCC, and around one fourths (25.9%) of physicians do not know if there is someone is allocated for TB control. (Table 2). Around 94% responded that TB suspect referral needs training, and 32.4% said it is not simple. More than one half (52.4%) of them suggested training of PHC staff on TB control emphasizing on suspect referral. Around 4.7% of physicians suggested mass health education and 1.8% suggested providing sputum examination for AFB at PHCC level. (Table 2)

**Table 2: Distribution of responses of PHCC physicians to questionnaire items.**

Item	Response	N (170)	%
Clinical features bring suspicion with tuberculosis disease in General?	Correct	21	12.4%
	Partial	33	19.4%
	Wrong	116	68.2%
When to suspect PTB	Correct	0	0.0%
	Partial	63	37.1%
	Wrong	107	62.9%
When PTB patients will not be contagious after starting treatment	Correct	7	4.1%
	Partial	70	41.2%
	Wrong	93	54.7%
The best method to confirm PTB	Correct	10	5.9%
	Partial	119	70.0%
	Wrong	41	24.1%
Heard about National TB program (NTP)	Yes	133	78.2%
	No	37	21.8%
NTP guideline is available in PHCC	Yes	74	43.5%
	No	16	9.4%
	I don't know	80	47.1%
Trained on TB control	Yes	23	13.5%
	No	147	86.5%
Drugs that are used as first line anti-TB	Correct	15	8.8%
	Partial	108	63.5%
	Wrong	47	27.6%
Met DTC during his visits to this PHCC	Yes	63	37.1%
	No	107	62.9%
Are there official directions to refer TB suspects to DTC unit	Yes	115	67.6%
	No	12	7.1%
	I don't know	43	25.3%
Have you been directed to refer TB suspects to DTC unit	Yes	136	80.0%
	No	34	20.0%

Is there an official target for how many cases should be referred	Yes, 3% of total PHCC visitors	32	18.8%
	No	40	23.5%
	I don't know	98	57.6%
To whom will you refer TB suspects	Local DTC unit/NTP	158	92.9%
	Public Hospital	8	4.7%
	Private Practitioner	4	2.4%
If you or your colleagues in PHCC do not refer TB suspects; the possible cause for this	Not aware about the concept of TB suspect	60	35.3%
	Refuse to refer to NTP/not believe in NTP/not good services at DTC	20	11.8%
	Workload/other answers	90	52.9%
What to direct or advise the TB suspect about on referring him to DTCU	Adherence to NTP in TB diagnosis and treatment	33	19.4%
	Other than above	137	80.6%
Is there documentation for referred cases in PHCC	Yes, in special register for TB suspect referral	59	34.7%
	Yes, in general register of referral	46	27.1%
	No, there is no documentation	19	11.2%
	I don't know	46	27.1%
Is there a physician allocated as a focal point for TB control in this PHCC	Yes, and only for TB control	22	12.9%
	Yes, but with other PHC responsibilities	92	54.1%
	No, there is no person responsible for TB activity in the PHCC	12	7.1%
	I don't know	44	25.9%
Source(s) of your information about TB	Training courses on TB control	18	100.0%
	CME activities (lectures, etc)	12	100.0%
	Medical College	153	100.0%
	Others (Journals, etc)	19	100.0%
Does the TB suspect referral system Needs training	Yes	160	94.1%
	No	10	5.9%
Is the TB suspect referral system simple	Yes	115	67.6%
	No	55	32.4%
Suggestions to improve TB suspect referral system	Training of PHC staff about NTP with special emphasis on TB suspect referral	89	52.4%
	Health education of people about TB and to visit DTC units on feeling like a TB suspect	8	4.7%
	Provide direct sputum examination for AFB at PHCCs level to avoid defaulting of TB suspects	3	1.8%

Total number of PHCC managers was 32. Their age varied from 31 to 59 year with mean age of 44.1 ( $\pm$  7.6) year (table 5). Male sex has dominated among managers (71.9%) compared to 28.1% of female managers (table 5). About half the managers (53.1%) were general practitioners, only one manager (3.1%) was an internist, and the remaining (43.8%) had other specialties including dentists (40.6%) and pharmacists (3.1%).

(Table 5) Work experience in primary health care varied from 1-30 years with mean of 11.4 ( $\pm$  6.7) years. Two of managers (6.3%) had experience not more than one year. Four (12.5%) had experience from 2-5 years and the majority (81.3%) had experience more than five years (table 5). Regarding the experience in administration in primary health care; experience varied from one to fifteen years, with average duration of 6.4  $\pm$  3.6 years.

Four (12.5%) of managers had experience up to one year, 25.0% of managers had experience between 2-5 years, and 62.5% of managers had experience of more than five years (table 3).

**Table 3: Personal characteristics of PHCC Managers enrolled in the study.**

Variables	Category	N(32)	%
Age (year)	25-45	15	46.9%
	46-65	17	53.1%
	Mean±SD:44.1±7.6 Min-Max Age Group31-59		
Sex	Mal	23	71.9%
	Female	9	28.1%
Specialty	General Practitioner	17	53.1%
	Family Medicine	0	0.0%
	Internal Medicine	1	3.1%
	Dentists	13	40.6%
	Pharmacists	1	3.1%
Years of work in PHCC	Up to 1 year	2	6.3%
	2-5 years	4	12.5%
	>5 years	26	81.3%
	Mean±SD:11.4±6.7 Min-Max Group1-30		
Years of experience (work) in PHC Administration	Up to 1 year	4	12.5%
	2-5 years	8	25.0%
	>5 years	20	62.5%
	Mean±SD:6.4±3.6 Min-Max Group1-15		

The majority (90.6%) of managers agreed that there are official directions for TB suspect referral to district TB coordinator units, as well as 96.9% will correctly refer TB suspects to NTP institutes. More than half (62.5%) of the managers identified the correct target of TB suspect referral, 21.9% of managers aware that there is a target but did not succeed to mention it, while five managers (15.6%) were not aware about this target. Around 94 % of managers stated there is documentation for referred TB suspects from the PHCC; the majority (59.3%) document in "general" register and 34.3% in TB suspect referral register, and only two (6.2%) managers mentioned there is no documentation for such cases. NTP guideline, up to managers' knowledge, is available in 81.2% of sampled PHCCs, though; only 18.8% of

managers (about one fourths of those have the guideline) mentioned the correct role of PHCC in TB control. Most (87.5%) of managers direct PHCC physicians refer TB suspects to DTC unit. Only one manager (3.1%) did not meet DTC. Two thirds (65.6%) of managers were trained on TB control. Training on TB control (59.4%) and college (46.9%) were the main sources of knowledge about TB. Most of managers (93.8%) agreed that the system is simple but needs training. Regarding improving this referral system, 62.5% of managers suggested train PHC staff, 12.5% suggest mass education of people, and one manager suggested allocating a monthly salary to TB patients to avoid primary defaulting of patients. As in table 4.

**Table 4: Distribution of responses of PHCC managers to questionnaire items.**

Item	Response	N (32)	%
Are there official directions for TB suspect referral to DTCU	Yes	29	90.6%
	No	3	9.4%
To whom will you refer TB suspects	Local DTC unit/NTP	31	96.9%
	Public Hospital	1	3.1%
	Private Practitioner	0	0.0%
There is an official target for how many cases required referral	Yes, 3% of total PHCC visitors	20	62.5%
	Yes, wrong/not know the target	7	21.9%
	No, there is no official target	5	15.6%
Is there documentation for referred cases in this PHCC	Yes, in special register for TB suspect referral	11	34.3%



	Yes, in general register of referral	19	59.3%
	No, there is no documentation	2	6.2%
Is there NTP guideline in this PHCC	Yes	26	81.2%
	No	6	18.8%
What is the role of PHCC according to NTP guideline	Correct	6	18.8%
	Partial	20	62.5%
	Wrong	6	18.8%
Do you direct physicians to refer cases to DTC unit	Yes	28	87.5%
	No	4	12.5%
When have you met local District TB coordinator	During DTC supervisory visits	10	31.2%
	During meetings for TB control	0	0.0%
	Both	21	65.6%
	Non of above	1	3.1%
Have you been Trained on TB control	Yes	21	65.6%
	No	11	34.4%
What are the sources of your information about TB	Training courses on TB control	19	59.4%
	CME activities (lectures, etc)	4	12.5%
	Medical College	15	46.9%
	Others (Journal, etc)	6	18.8%
Does the TB suspect referral system Needs training	Yes	30	93.8%
	No	2	6.2%
Is the TB suspect referral system simple	Yes	30	93.8%
	NO	2	6.2%
Suggestions to improve TB suspect referral system	Training of PHC staff about NTP with special emphasis on TB suspect referral	20	62.5%
	Educating people about TB and to visit DTCUs on feeling like a TB suspect	4	12.5%
	Allocate monthly salary to TB patients to drain more patients	1	3.1%

Two PHCCs from different health districts do not document referred TB suspects. Nineteen (59.3%) of PHCCs document TB suspects in a general register, while eleven (34.3%) have a specific TB suspect referral register. Twelve PHCCs (40%) referred TB suspects within less than 10 days before the investigator's visit, five PHCCs (16.6%) referred within 10-19 days, four PHCCs (13.3%) referred within 20-29 days, and nine

PHCCs (30%) referred more than 30 days before the visit. Population density varies across PHCCs, with higher densities in peripheral districts (Mahmodia & Abograib) and lower in central districts (Resafa & Adhamia). The number of respiratory cases aligns with population density, with the highest loads seen in Abograib and Mahmodia, except for Sadr, where respiratory cases were particularly high. As in table 6.

**Table 6: Distribution of PHCCs by type of register, Distribution of PHCCs by number of days since last refer, Distribution of PHCCs by achieved referral TB suspects, Distribution of PHCCs by achieved referral TB suspects.**

Type of Register	No. of PHCCs	(%)
General Register	19	59.3%
Suspected TB register	11	34.3%
No Documentation	2	6.2%
No of Days	No of PHCCs	(%)
<10	12	40%
10-19	5	16.6%
20-29	4	13.3%
>30	9	30%
Percentage of Referral Suspected TB	Numbers of PHCCs	%
X	5	17.2%
1-10%	18	62%
11-30%	3	10.3%

Percentage of Referral Achievement	Numbers of DTCs	Percentage
>30%	3	10.3%
<1%	1	6.7%
1-10%	11	73.3%
11-30%	1	6.7%
>30%	2	13.3%

## DISCUSSION

The identification and referral of TB suspects within primary health care (PHC) settings is crucial for effective tuberculosis control, especially in a country like Iraq. The study revealed several issues that hindered the proper functioning of TB suspect identification and referral systems across selected PHCCs, mainly due to inadequate knowledge of health workers, lack of official directions, and poor adherence to the National TB Program (NTP). The **low rate of TB suspect referrals** from PHCCs to District TB Coordinating Units (DTCUs), at only 26.4%, is consistent with findings in other regions. For example, Abayneh M et al. reported a similarly low referral rate in Bangladesh, highlighting similar issues of slow or unreliable referral systems.<sup>[14]</sup> This study also found that **non-functioning referral systems** may be a result of insufficient knowledge about TB symptoms and the referral system, which is in line with studies by Badane AA et al. and Der JB et al. (2007).<sup>[15,16]</sup> The referral rates in other regions, such as sub-Saharan Africa, have been reported as higher, as in Kariuki S. et al.'s study, which observed a 49% referral rate.<sup>[17]</sup> This indicates a significant gap in Iraq's TB referral system, requiring attention to improve health workers' knowledge and training. The **knowledge gap** among PHC physicians was particularly alarming, as only 12.5% knew the major symptoms of TB and none could correctly identify when to suspect pulmonary TB (PTB). This finding contrasts sharply with earlier studies conducted in Iraq, such as Hashim et al. (2003), which reported 98.4% of health care workers as knowledgeable about TB.<sup>[18]</sup> The **poor knowledge of TB symptoms** among physicians in Iraq is consistent with similar findings in other countries, such as India and Pakistan, where the levels of knowledge about TB symptoms varied widely depending on training and health system infrastructure.<sup>[19-21]</sup> These variations highlight the need for continuous professional development and better training programs, which have been affected by the country's security situation and inadequate supervision.<sup>[19-21]</sup> Regarding **diagnostic knowledge**, only 5.9% of physicians in the study used both sputum smear and culture for confirming PTB, while 70% relied on one of these methods. This finding is concerning given that sputum microscopy is the gold standard for TB diagnosis.<sup>[22]</sup> Studies in Ethiopia show that many health workers rely on chest X-rays for diagnosis, which is not a reliable diagnostic tool.<sup>[23]</sup> This over-reliance on chest X-rays could lead to false-positive diagnoses, unnecessary treatment, or delayed TB treatment, increasing the burden on both the patient and the health system.<sup>[24]</sup> The use of sputum smear microscopy must be emphasized in training programs to reduce over-

diagnosis and improve diagnostic accuracy. The **lack of knowledge about NTP guidelines** was evident, with only 78.1% of physicians having heard of the NTP, and less than half knowing that the guidelines were available in their PHCCs. This discrepancy between awareness and the application of the NTP guidelines is alarming. In contrast, district TB coordinators and PHCC managers were generally well-informed about the guidelines, suggesting poor communication and collaboration between PHCC physicians, managers, and TB coordinators.<sup>[25]</sup> Similar findings were observed in Pakistan and the Philippines, where awareness of NTP policies among health care workers was low.<sup>[26]</sup> Ensuring that all health care workers are familiar with and adhere to the NTP guidelines is crucial for effective TB control. The **low training coverage** of physicians (only 13.5% had been trained on TB control) was another major concern. In other regions, training has shown to significantly improve knowledge and practices related to TB control.<sup>[27]</sup> The lack of association between training and knowledge in this study indicates that the **quality and quantity of training** may be insufficient.<sup>[28]</sup> Improving the coverage and quality of training programs for physicians is essential for addressing the knowledge gaps observed in this study. In terms of **practice**, while 92.9% of physicians referred TB suspects to the correct facilities, a small percentage (2.4%) referred to non-TB specialized caregivers, such as private practitioners. This could be due to a lack of trust in the NTP facilities or patient stigma, both of which delay diagnosis and treatment, increasing TB transmission in the community.<sup>[29]</sup> In other studies, such as one conducted in Vietnam, delays in referral were similarly linked to stigma and misconceptions among health workers.<sup>[30]</sup> Addressing these issues through health education and improving the trust in NTP facilities is critical for ensuring timely and accurate TB diagnosis. Lastly, **documentation practices** were lacking in many PHCCs, with only 34.7% using a special register for TB suspect referrals, and some PHCCs not documenting referrals at all.<sup>[9]</sup> This lack of documentation hinders the ability to track and manage TB cases effectively.<sup>[9]</sup> Proper documentation is essential for monitoring and evaluating the success of referral systems and improving TB control efforts.

## CONCLUSION

This study highlights several key challenges in the identification, referral, and treatment of TB suspects in PHCCs in Baghdad, including knowledge gaps, inadequate training, poor documentation, and weak referral systems. Addressing these issues through improved training, better supervision, and stronger

collaboration between PHC staff and TB coordinators is crucial for enhancing TB control efforts in Iraq.

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