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Impact of a TB Team on TB Outcomes: A 2016–2024 Pre-Post Study From a Referral Center in Southern Italy

Francesco Di Gennaro,[1] Sergio Cotugno,[1] Giacomo Guido,[1] Francesco Cavallin,[2] Roberta Papagni,[1] Elda De Vita,[1] Giorgia Manco Cesari,[1] Stefano Di Gregorio,[1] Vincenzo Giliberti,[1] Domenica Cassano,[1] Giuliana Metrangolo,[1] Angela Amendolara,[1] Alessandro Francabandiera,[1] Monica Fiorella,[1] Vittoria Lobalsamo,[1] Gaetano Brindicci,[1] Carmen Rita Santoro,[1] Luigi Ronga,[3] Rossana Lattanzio,[1] Giuseppina De Iaco,[1] and Annalisa Saracino[1]

[1]Department of Precision and Regenerative Medicine and Jonian Area (DiMePreJ), Clinic of Infectious Diseases, University of Bari Aldo Moro, Bari, Italy, [2]Independent Statistician, Solagna, Italy, and [3]Microbiology and Virology Unit, University of Bari, University Hospital Policlinico, Bari, Italy

Background. Tuberculosis (TB) remains a major global public health challenge, requiring innovative management strategies to improve patient outcomes and reduce disease burden. Despite advancements in diagnostics and treatment, TB continues to cause significant morbidity and mortality worldwide, particularly among vulnerable populations such as migrants and individuals with limited healthcare access. The World Health Organization has emphasized the need for patient-centered approaches, including the establishment of TB-dedicated teams, to enhance care coordination and improve outcomes. However, real-world evidence on their effectiveness remains limited.

Methods. We conducted a retrospective before-after study to evaluate the impact of a structured TB-dedicated team implemented at a referral hospital in Southern Italy between 2016 and 2024. Prior to 2020, TB care was unstructured, with patients being followed by different physicians without a standardized system. Between 2021 and 2024, a dedicated TB team was established, comprising 2 infectious disease specialists, infectious disease residents, and a senior professor overseeing scientific activities. This new model introduced key interventions, including a dedicated outpatient reservation system, directly observed therapy, structured follow-up, specialist networking, systematic data collection, and targeted counseling on risk behaviors and comorbidities. Primary outcomes included treatment success rates, hospital length of stay, incidence of adverse events, and patient retention in follow-up programs. All tests were 2-sided and a *P*-value <.05 was considered statistically significant. Statistical analysis was carried out using R 4.4.

Results. A total of 269 TB patients were analyzed (117 pre- and 152 postimplementation). The introduction of the TB team was associated with a significant reduction in loss to follow-up (41.9% to 3.7%; $P < .0001$; odds ratio, 0.04; 95% confidence interval, .01–.12) and incomplete treatments (41.9% to 12.0; $P < .0001$; odds ratio, 0.13; 95% confidence interval, .06–.29). Median hospital stay decreased from 28 to 14 days ($P < .0001$), whereas adverse events remained comparable (32.5% vs 29.6%, $P = .71$).

Conclusions. The implementation of a TB-dedicated team significantly improved TB management by enhancing treatment adherence, reducing hospitalization, and preventing loss to follow-up. Given the public health impact of TB, structured care models should be prioritized to optimize patient outcomes and strengthen health system efficiency.

Keywords. loss to follow-up; migrant health; public health interventions; TB-dedicated team; tuberculosis.

Tuberculosis (TB) remains a major global public health challenge, necessitating effective management strategies to improve patient outcomes and reduce disease burden. Despite significant advancements in diagnostics and treatment, TB continues to be one of the leading causes of morbidity and mortality worldwide. According to the Global TB Report 2024, an estimated 10.6 million people developed TB in 2023, with 1.3 million deaths, despite the availability of effective treatment [1]. Although the disease primarily affects low- and middle-income countries, it also poses a substantial burden in high-income settings, particularly among vulnerable populations such as migrants, individuals experiencing socioeconomic hardship, immunocompromised patients, and those with limited healthcare access [2, 3]. These populations not only face a higher risk of TB acquisition but also experience poorer clinical outcomes, including delayed diagnosis, suboptimal treatment adherence, and increased loss to follow-up (LTFU) [4, 5].

Despite advancements in diagnostics and therapeutics, several persistent barriers continue to hinder effective TB management. These include delays in diagnosis, inadequate adherence to treatment, fragmented healthcare pathways, and high LTFU rates, all of which contribute to incomplete treatment, ongoing

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Correspondence: Giacomo Guido, MD, PhDc, Department of Precision and Regenerative Medicine and Jonian Area (DiMePreJ), Clinic of Infectious Diseases, University of Bari Aldo Moro, Piazza G. Cesare 11, 70124 Bari, Italy (giacguido@gmail.com).

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transmission, and the emergence of drug-resistant TB strains [6, 7]. Recognizing these challenges, the World Health Organization has underscored the need for patient-centered approaches to TB care, advocating for structured care pathways that address both clinical and social determinants of health. Among these strategies, the implementation of TB-dedicated teams has emerged as a promising approach to enhance care coordination, facilitate early intervention, and ultimately improve patient outcomes [8].

Although the growing recognition of TB-dedicated teams as an effective model of care, real-world evidence on their impact remains limited. This study aimed to evaluate the effectiveness of a TB-dedicated team in optimizing key aspects of TB management, including treatment success rates, hospital length of stay, adverse events, and patient retention in follow-up programs. The final purpose was to provide useful insights to stakeholders and policy makers about the effectiveness of this approach in a real-world clinical setting.

MATERIALS AND METHODS

Study Design

This was a retrospective, before-after study assessing the implementation of a TB-dedicated team in an Italian referral hospital from 2016 to 2024. The study was approved by the local Ethics Committee (number 9128, 21 November 2023), which waived the need for written consent from patients because of the retrospective design and the use of anonymized data.

Setting

This study was conducted in the Infectious and Tropical Disease Unit of the Azienda Ospedaliero-Universitaria Consorziale Policlinico di Bari, a teaching hospital and referral center in Apulia, Southern Italy. The hospital serves as a major hub for TB diagnosis, treatment, and follow-up, particularly for populations with limited healthcare access. Patients included in this study were referred from various sources, including other hospital departments, regional healthcare facilities, local clinics, and specialized services for migrant health. Additionally, a portion of the patients were referred by nongovernmental organizations providing healthcare support to migrants and homeless individuals, who often face severe barriers to accessing formal healthcare services. Apulia has a high prevalence of migrant agricultural workers, many of whom live in poor socioeconomic conditions, often under exploitative labor under a phenomenon mafia-like system known as "caporalato." These workers face limited access to healthcare services, increasing their vulnerability to TB. Furthermore, a portion of the TB cases in our cohort involved native individuals experiencing TB reactivation, often due to advanced age or high-risk occupational exposure.

Patients

All patients diagnosed with TB between 2016 and 2024 were eligible for inclusion in the study. Inclusion criteria encompassed individuals older than 18 years for whom a clinician decided to initiate anti-TB treatment. Patients diagnosed in 2020 were excluded from the study because of the ongoing implementation of the TB-dedicated team and the impact of the COVID-19 pandemic, which significantly reduced outpatient clinic activities. Hence, all TB diagnoses in 2016–2019 were included in the before-implementation period, and all TB diagnoses in 2021–2024 were included in the after-implementation period.

Implementation of the TB-dedicated Team

Before 2020, TB patients were managed within a general outpatient clinic, which also addressed various other infectious disease conditions. Some patients received follow-up care after discharge, whereas others were monitored within migrant ambulatory services. However, the absence of a specialized TB unit led to fragmented care, increasing the risk of treatment discontinuation and LTFU.

The COVID-19 pandemic in 2020 led to disruptions in outpatient services, highlighting the urgent need for a structured TB-focused approach. The risk of missed diagnoses and LTFU became more pronounced, necessitating a dedicated strategy. To address these challenges, a team of infectious disease specialists committed themselves to TB-specific care, ensuring continuity despite the pandemic's constraints.

Between 2021 and 2024, 2 infectious disease specialists were formally assigned to the TB outpatient service, and infectious disease residents actively participated in its management. Additionally, a professor of infectious diseases was appointed to oversee the scientific output of the TB unit. The establishment of this dedicated TB team resulted in the implementation of key services, including:

- A dedicated outpatient reservation system for TB patients
- Adherence treatment monitoring, through phone contact, pill counting, dose preparation, and structured follow-up call monitoring
- Specialist networking for direct patient referrals
- Continuous monitoring and management of drug shortages and treatment availability
- Systematic data collection, reporting, and advocacy for TB care improvements
- Engagement in scientific research and operational research initiatives
- Regular case discussions to enhance clinical decision-making in TB management
- Counseling on risk behaviors that may worsen TB outcomes
- Counseling and management of TB-related comorbidities

Endpoints

The endpoints included TB treatment success rate, length of hospital stay, incidence of adverse events related to anti-TB therapy, and rate of loss to follow-up.

Data Collection

All data were retrieved from the hospital charts or acquired during visits and collected in an anonymized database for the analysis. Data collection comprised demographics, clinical characteristics and medical history, treatment information, adverse events, and length of hospital stay.

Subclinical TB was defined as pulmonary TB presenting with no symptoms or only night sweats and/or weight loss, and in any case, without cough, fever, chest pain, hemoptysis, or dyspnea.

Statistical Analysis

Numerical data were summarized as median and interquartile range, and categorical data as absolute and relative frequency (percentage). Data were compared between before- and after-implementation periods using Mann-Whitney test (continuous data) and Fisher test or chi squared test (categorical data). The effect sizes from bivariable analyses were reported as median difference with 95% bootstrap confidence interval (CI; using resampling with replacement to create 1000 samples of the same size as the original) or odds ratio (OR) with 95% CI.

Overall, the association between the implementation of the TB-dedicated team and each outcome measure was investigated using 2 regression models adjusting for (1) clinically relevant variables that were unbalanced between the 2 periods (model A) and (2) age, sex, and other key confounders based on prior knowledge (model B).

Specifically, the association with the length of hospital stay was investigated using a linear regression model with logarithmic transformation. Model A also included body mass index (BMI), hypertension, hepatitis B virus (HBV)/hepatitis C virus (HCV) infection history, previous TB, confirmed versus presumptive diagnosis, pulmonary versus extrapulmonary TB; model B also included age, sex, Timika score, and migrant status. The effect size was reported as the percent increase (with 95% confidence interval) in length of hospital stay on average after the implementation of the TB-dedicated team.

The association with the occurrence of adverse events was investigated using a logistic regression model. The model A also included BMI, hypertension, HBV/HCV infection history, previous TB, pulmonary versus extrapulmonary TB; model B also included age, sex, and migrant status.

The association with the incomplete treatment was investigated with a logistic regression model. Model A also included hypertension, HBV/HCV infection history, previous TB, pulmonary versus extrapulmonary TB; model B also included age, sex, migrant status, previous TB, and pulmonary versus extrapulmonary TB.

The association with the loss to follow-up was investigated with a logistic regression mode. Model A also included HBV/HCV infection history, previous TB, pulmonary versus extrapulmonary TB; model B also included age, sex, migrant status, and HBV/HCV infection history.

The effect sizes from the logistic models were reported as OR with 95% CI. All tests were 2-sided and a P-value <.05 was considered statistically significant. Statistical analysis was carried out using R 4.4 (R Foundation for Statistical Computing, Vienna, Austria) [9].

RESULTS

The analysis included 117 patients who were diagnosed before the implementation of the TB-dedicated team and 152 patients who were diagnosed after its implementation.

Demographics and clinical characteristics are summarized in Table 1. The patients who were diagnosed in the 2 periods were different in terms of BMI, hypertension, chronic cough (less frequent after the implementation), and liver disease, fever, weight loss, hemoptysis, pulmonary TB, and presumptive TB (more frequent after the implementation) (Table 1).

Clinically Relevant Outcomes

Table 2 displays the clinically relevant outcomes before and after the implementation of the TB-dedicated team.

The median length of hospital stay was reduced from 28 to 14 days after the implementation of the TB-dedicated team ($P < .0001$). Adjusting for clinically relevant confounders that were unbalanced between the 2 periods (model A), the implementation of the TB-dedicated team was associated with a 22% decrease of the length of hospital stay on average (95% CI, 1–40; $P = .04$), as illustrated in Figure 1. Adjusting for age, sex, and other key confounders (model B), the implementation of the TB-dedicated team was associated with a 41% decrease of the length of hospital stay on average (95% CI, 28–53; $P < .0001$).

The occurrence of adverse events was not statistically different before and after the implementation of the TB-dedicated team (32.5% vs 29.6%; $P = .71$). The severity of adverse events was also not statistically different between the 2 periods ($P = .63$). Adjusting for clinically relevant confounders that were unbalanced between the 2 periods (model A), the implementation of the TB-dedicated team was not a contributing factor for the occurrence of adverse events (OR, 1.12; 95% CI, 0.59–2.17; $P = .72$). Adjusting for age, sex, and other key confounders (model B), the implementation of the TB-dedicated team was not a contributing factor for the occurrence of adverse events (OR, 0.87; 95% CI, .51–1.49; $P = .61$).

When excluding the patients undergoing treatment at the time of the analysis, the proportion of incomplete treatments decreased from 41.9% to 12.0% after the implementation of the TB-dedicated team ($P < .0001$). Adjusting for clinically relevant confounders that were unbalanced between the 2 periods (model A), the implementation of the TB-dedicated team was confirmed as protective factor for incomplete treatment (OR, 0.13; 95% CI, .06–.29; $P < .0001$). Adjusting for age, sex, and other key confounders (model B), the implementation of the

Table 1. Demographics and Clinical Characteristics Before and After the Implementation of the TB-dedicated Team

	Before-implementation Period (n = 117)	After-implementation Period (n = 152)	Odds Ratio (95% CI) or Median Difference (95% CI)	*P* Value
Age, y[a]	38 (23–68)	47 (29–64)	9 (0–20)	.26
Age, y	…	…	…	.15
<65	78/117 (66.7%)	114/151 (75.5%)	Reference	
65 or older	39/117 (33.3%)	37/151 (24.5%)	0.65 (0.38–1.11)	
Age, y	…	…	…	.34
<65	78/117 (66.7%)	114/151 (75.5%)	Reference	
65–74	22/117 (18.8%)	21/151 (13.9%)	0.65 0.34–1.27)	
75–84	13/117 (11.1%)	10/151 (6.6%)	0.53 (0.22–1.26)	
85 or older	4/117 (3.4%)	6/151 (4.0%)	1.03 (0.28–3.76)	
Males	79/117 (67.5%)	103/152 (67.8%)	0.99 (0.58–1.66)	.99
Migrants	58/117 (49.6%)	74/152 (48.7%)	1.04 (0.64–1.68)	.98
WHO region	…	…	…	.34
African Region	20/58 (34.5%)	28/74 (37.8%)	Reference	
Region of the Americas	0/58 (0.0%)	1/74 (1.4%)	1.43 (0.05–44.68)	
Eastern Mediterranean Region	16/58 (27.6%)	11/74 (14.9%)	0.49 (0.19–1.28)	
European Region	13/58 (22.4%)	18/74 (24.3%)	0.99 (0.40–1.27)	
South-Eastern Asian Region	7/58 (12.1%)	10/74 (13.5%)	1.2 (0.33–3.14)	
Western Pacific Region	0/58 (0.0%)	4/74 (5.4%)	5.71 (0.29–114.25)	
Unspecified	2/58 (3.4%)	2/74 (2.7%)	0.71 (0.09–5.51)	
BMI	…	…	…	<.0001
Underweight	76/116 (65.5%)	33/140 (23.6%)	Reference	
Normal weight	34/116 (29.3%)	93/140 (66.4%)	6.30 (3.57–11.10)	
Overweight/obese	6/116 (5.2%)	14/140 (10.0%)	5.37 (1.90–15.20)	
Worker	51/101 (50.5%)	54/137 (39.4%)	0.64 (0.38–1.07)	.12
Smoking habits	18/95 (18.9%)	42/143 (29.4%)	1.80 (0.96–3.36)	.10
Diabetes	7/116 (6.0%)	17/151 (11.3%)	1.98 (0.79–4.94)	.21
Hypertension	42/116 (36.2%)	34/148 (23.0%)	0.53 (0.31–0.90)	.03
Heart disease	16/116 (14.0%)	15/148 (10.1%)	0.70 (0.33–1.49)	.47
COPD/bronchiectasis	21/116 (18.1%)	17/146 (11.6%)	0.60 (0.30–1.19)	.19
Chronic renal disease	8/116 (6.9%)	7/151 (4.6%)	0.66 (0.23–1.87)	.60
HBV/HCV infection history	2/116 (1.7%)	12/150 (8.0%)	4.96 (1.09–22.60)	.03
PWHIV	4/116 (3.4%)	6/152 (3.9%)	1.15 (0.32–4.18)	.99
Cancer	4/116 (3.4%)	6/150 (4.0%)	1.17 (0.32–4.23)	.99
Previous TB	19/116 (16.4%)	13/151 (8.6%)	0.48 (0.23–1.02)	.06
Cough	64/116 (55.2%)	74/151 (49.0%)	0.78 (0.48–1.27)	.33
Chronic cough (at least 8 wk)	67/117 (57.3%)	30/152 (19.7%)	0.18 (0.11–0.32)	<.0001
Fever	21/115 (18.3%)	45/152 (29.6%)	1.88 (1.05–3.39)	.04
Weight loss	21/116 (18.1%)	58/152 (38.2%)	2.79 (1.57–4.96)	.0004
Night sweats	11/116 (9.5%)	24/152 (15.8%)	1.79 (0.84–3.82)	.15
Chest pain	4/116 (3.4%)	15/152 (9.9%)	3.07 (0.99–9.50)	.05
Dyspnea	12/116 (10.3%)	25/152 (16.4%)	1.71 (0.82–3.56)	.21
Hemoptysis	2/116 (1.7%)	12/152 (7.9%)	4.89 (1.07–22.28)	.03
Diagnosis	…	…	…	<.0001
Confirmed TB	113/117 (96.6%)	122/152 (80.3%)	Reference	
Presumptive TB	4/117 (3.4%)	30/152 (19.7%)	6.95 (2.37–20.34)	
Pulmonary TB	51/117 (43.6%)	108/152 (71.0%)	Reference	<.0001
Extrapulmonary TB	62/117 (53.0%)	22/152 (14.5%)	0.17 (0.09–0.31)	
Pulmonary + extrapulmonary TB	4/117 (3.4%)	22/152 (14.5%)	2.65 (0.87–8.08)	
Pulmonary subclinical TB	6/55 (10.9%)	10/121 (8.3%)	0.74 (0.25–2.14)	.58
Timika score[b]	60 (40–80)	60 (40–100)	0 (0–40)	.39
Drug resistance	…	…	…	.43
Pan-susceptible	111/117 (94.9%)	137/152 (90.1%)	Reference	
Monoresistant	4/117 (3.4%)	7/152 (4.6%)	1.49 (0.43–5.23)	
MDR	2/117 (1.7%)	5/152 (3.3%)	2.14 (0.41–11.21)	
pre-XDR/XDR	0/117 (0.0%)	3/152 (2.0%)	5.12 (0.25–103.34)	

Data summarized as n (%) or median (interquartile range).

Abbreviations: BMI, body mass index; CI, confidence interval; COPD, chronic obstructive pulmonary disease; HBV, hepatitis B virus; HCV, hepatitis C virus; MDR, multidrug resistant; PWHIV, people with HIV; TB, tuberculosis; WHO, World Health Organization; pre-XDR, pre-extensively drug resistant tuberculosis; XDR, extensively drug resistant tuberculosis.

[a]Data not available in 1 patient.

[b]Data not available in 31 patients.

Table 2. Clinically Relevant Outcomes Before and After the Implementation of the TB-dedicated Team

	Before-implementation Period (n = 117)	After-implementation Period (n = 152)	Odds Ratio (95% CI) or Median Difference (95% CI)	*P Value*
Length of hospital stay, d	28 (19–46)	14 (14–22)	−14 (−21 to −10)	<.0001
Adverse events	38/117 (32.5%)	45/152 (29.6%)	0.87 (0.52–1.47)	.71
Severity of the adverse events	…	…	…	.63
Mild	13/38 (34.2%)	16/45 (35.6%)	Reference	
Moderate	23/38 (60.5%)	24/45 (53.3%)	0.94 (0.66–1.34)	
Severe	2/38 (5.3%)	5/45 (11.1%)	1.79 (0.40–8.00)	
Outcome	…	…	…	…
Complete treatment	68/117 (58.1%)	95/152 (62.5%)		
Under treatment	0/117 (0.0%)	44/152 (28.9%)		
Incomplete treatment	49/117 (41.9%)	13/152 (8.6%)		
Outcome (without patients under treatment)	…	…	…	<.0001
Complete treatment	68/117 (58.1%)	95/108 (88.0%)	Reference	
Incomplete treatment	49/117 (41.9%)	13/108 (12.0%)	0.29 (0.17–0.50)	
Lost to follow-up (without patients under treatment)	49/117 (41.9%)	4/152 (3.7%)	0.06 (0.02–0.17)	<.0001

Data summarized as n (%) or median (interquartile range). Adverse events included: hepatitis (n = 44), gastrointestinal (n = 10), cutaneous (n = 6), neuropathy (n = 3), visual impairment (n = 2), hearing impairment (n = 2), renal failure (n = 2), more than one symptom (n = 6), QT prolongation (n = 2), generalized malaise (n = 5), psychosis (n = 1).

Abbreviations: CI, confidence interval; TB, tuberculosis.

TB-dedicated team was confirmed as protective factor for incomplete treatment (OR, 0.13; 95% CI, .06–.29; $P < .0001$).

When excluding the patients undergoing treatment at the time of the analysis, the proportion of lost to follow-up reduced from 41.9% to 3.7% after the implementation of the TB-dedicated team ($P < .0001$). Adjusting for clinically relevant confounders that were unbalanced between the 2 periods (model A), the implementation of the TB-dedicated team was confirmed as protective factor for loss to follow-up (OR, 0.04; 95% CI, .01–.12; $P < .0001$). Adjusting for age, sex and other key confounders (model B), the implementation of the TB-dedicated team was confirmed as protective factor for loss to follow-up (OR, 0.03; 95% CI, .01–.08; $P < .0001$).

DISCUSSION

The implementation of a TB-dedicated team at our referral center significantly improved multiple aspects of TB management. Specifically, we observed an increase in treatment completion rates, a substantial decrease in LTFU and a reduction in hospital length of stay. These findings suggest that a structured care model, incorporating dedicated specialists and targeted management strategies, can enhance both clinical outcomes and healthcare system efficiency in the management of TB.

The demographic and clinical characteristics of patients before and after the introduction of the TB-dedicated team remained largely comparable, particularly in terms of gender, age, and migration status. This is consistent with global epidemiological trends [1, 10] and underscores the longstanding recognition of migration as a well-established risk factor for TB and worse outcomes, which has prompted routine screening and targeted interventions even before the establishment of a dedicated TB team [11–14].

When evaluating common TB-associated risk factors, we found no significant differences in diabetes and smoking habits between the 2 periods. Although integrating diabetes and smoking cessation programs into TB care is widely recognized as beneficial, our study did not assess the direct impact of such interventions on treatment outcomes [15–19]. Similarly, while HIV co-infection rates remained stable, this may reflect the presence of specialized HIV services within the Infectious Disease Department. However, our study does not provide direct evidence on the effectiveness of systematic HIV screening in this setting. Further and multicenter research is warranted to evaluate the impact of these integrated approaches on TB management [20]. Malnutrition was more prevalent in patients diagnosed before the establishment of the TB team. Given the well-documented relationship between malnutrition and TB [21,22], it is plausible that malnutrition served as a key clinical indicator prompting TB investigations before the introduction of a more structured diagnostic approach. However, this finding may be influenced by the less structured assessment of BMI before the establishment of the TB team. In fact, fever, weight loss, and hemoptysis were more frequently reported after the TB team was established, potentially reflecting enhanced clinical awareness and earlier case identification facilitated by the specialized team.

A notable shift in diagnostic patterns was observed following the implementation of the TB-dedicated team. Although the incidence of subclinical TB remained stable, consistent with ongoing debates regarding its definition and diagnostic criteria [23,24], there was a marked increase in presumptive TB diagnoses, particularly pulmonary TB. This trend likely reflects a

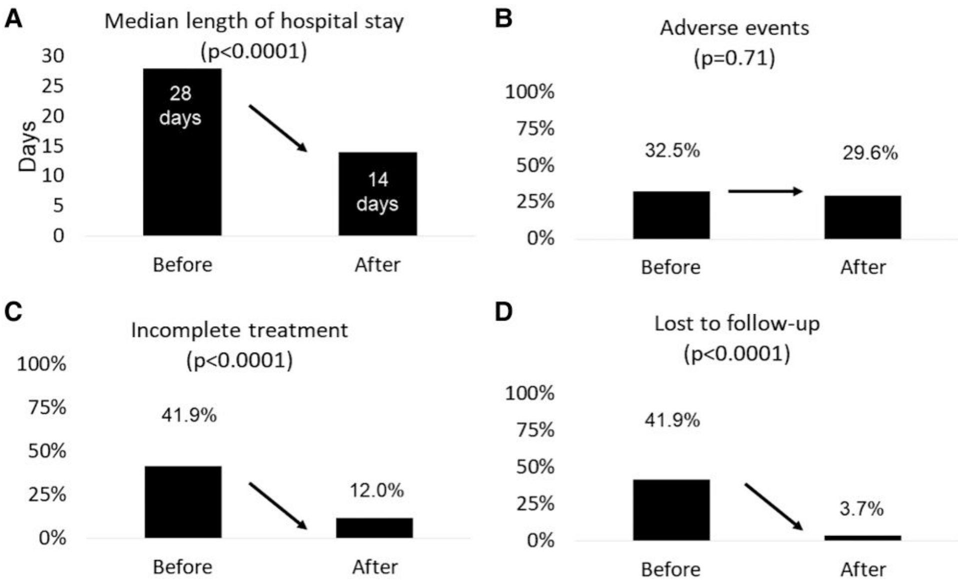

Figure 1. Visual summary of the main findings: length of hospital stay (*A*), incomplete treatments (*C*), and loss to follow-up (*D*) reduced after the implementation of the TB-dedicated team, while the occurrence of adverse events was comparable before and after the implementation of the TB-dedicated team (*B*). Abbreviation: TB, tuberculosis.

multifactorial impact: the presence of TB specialists facilitated a more proactive and structured approach to diagnosis, emphasizing early detection and comprehensive clinical assessment beyond sole reliance on microbiological confirmation, as previously reported in settings with specialist-led TB care [25]. Moreover, the intervention appeared to generate a broader cultural shift in TB recognition and management within our institution, fostering heightened clinical awareness in both inpatient and outpatient settings. Increased referrals from other hospitals further suggest the extended influence of a coordinated and centralized TB care model, reinforcing the role of dedicated teams in enhancing diagnostic capacity and case detection. In addition, the increase in TB diagnoses observed in outpatient settings may be partially attributed to the improved collaboration between the TB-dedicated team and other specialists. Although no standardized referral system was in place—an aspect that represents a key area for future implementation—the presence of a recognized TB-dedicated team within our hospital-facilitated patient referrals. Additionally, the consistency of the TB team members likely contributed to strengthening interpersonal relationships with pulmonologists, thoracic surgeons, microbiologists, and emergency departments, ensuring a more stable and efficient communication process compared to a system where different specialists had to interact with multiple interlocutors over time.

It is important to note that the reported symptoms, including cough and chronic cough, were self-reported by patients at the time of diagnosis and may therefore be subject to recall bias or individual perception. Furthermore, in a migrant population such as ours, cough may be reported independently of TB, as it can be influenced by poor living and working conditions that predispose individuals to nonspecific respiratory symptoms. Although the proportion of extrapulmonary TB was higher in the preintervention period, our center routinely performs microbiological analyses on nonrespiratory samples, including urine and stool. This approach may have increased the likelihood of microbiological confirmation even in extrapulmonary TB cases.

Overall, our findings suggested some advantages of the establishment of a TB-dedicated team, which was associated with increased treatment completion rate and decreased LTFU. These improvements underscore the effectiveness of a structured, patient-centered approach in enhancing treatment adherence and ensuring continuity of care. Beyond clinical management, TB-dedicated teams also play a crucial role in addressing nonmedical determinants of health, which frequently act as barriers to care, particularly among socially and economically vulnerable populations. The marked reduction in hospitalization length following the implementation of the TB-dedicated team may be attributed to improved coordination between inpatient and outpatient care. The TB team not only provided guidance and standardized protocols to hospital wards but also included members actively involved in inpatient care, ensuring direct support for clinical decision-making. Moreover, the establishment of a dedicated outpatient TB clinic allowed for early postdischarge follow-up, which likely facilitated earlier hospital discharge while maintaining patient safety and continuity of care. These factors collectively contributed to optimizing hospitalization duration as part of a structured, patient-centered TB management approach

Our findings are consistent with previous research highlighting the role of specialized TB services in enhancing health system responsiveness, even in low-TB-burden settings [26, 27]. The integration of dedicated TB teams into hospital workflows has been widely recognized as a best practice in TB management [26], offering significant cost-saving benefits, particularly considering that hospitalization remains one of the primary drivers of TB-related healthcare expenditures [28, 29]. Our findings align with broader evidence from other disease areas, demonstrating that specialized teams can improve patient outcomes across various conditions [30, 31]. This approach is particularly crucial for diseases like TB, which not only require long-term adherence to complex treatment regimens but also disproportionately affect socially vulnerable populations [32, 33]. Finally, beyond structured interventions, the dedication and commitment of the TB-dedicated team likely played a crucial role in improving patient outcomes. The passion for TB care, the enthusiasm of medical residents, and the flexibility of dedicated nurses, who adapted to patients' needs even at unconventional hours, may have contributed to better adherence and follow-up. Although these aspects are difficult to quantify scientifically, they highlight the importance of human engagement and ethical commitment in strengthening TB care and patient management

This study has some limitations. Its retrospective design does not allow for a definitive causal relationship between the implementation of the TB-dedicated team and the observed improvements. Additionally, social determinants of health were not comprehensively analyzed, limiting our ability to assess the impact of the team on vulnerable or hard-to-reach populations. Furthermore, some parameters could not be evaluated due to a lack of data in the pre-TB team period, including patient-related and hospital-related diagnostic delays, modifications to anti-TB therapy following adverse events, and the overall impact of adverse drug reactions on treatment outcomes. Nevertheless, the establishment of the TB-dedicated team fostered a culture of systematic data collection and scientific reporting, which is crucial for improving TB management and informing future policy decisions.

In conclusion, the implementation of a TB-dedicated team improved TB management at our center, reducing hospital length of stay, increasing treatment completion rates, and dramatically decreasing LTFU. Furthermore, given the public health impact of TB, ensuring structured, coordinated patient centered approach through dedicated teams is a key strategy for reducing transmission, improving clinical outcomes, and strengthening health system efficiency. Moreover prospective, multicenter studies could help confirm the effectiveness of this approach in different healthcare settings.

Notes

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Data sharing agreement. Deidentified individual study data reported in this article can be requested upon application to the investigator board via the corresponding author.

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