
Tuberculosis Control Based on Integrated Primary Healthcare at Mulyorejo Community Health Center in Surabaya

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Abstract. Tuberculosis (TB) remains an important public health problem requiring strengthened control at the primary health care level. This study aimed to analyze TB control problems and formulate alternative solutions based on Integrated Primary Care (ILP) principles at the Mulyorejo Community Health Center, Surabaya. A descriptive analytical design with a case study approach was used. Data were obtained from the 2024 Community Health Center Performance Assessment (PKP), TB program reports, health profiles of Surabaya City and East Java Province, discussions with the TB program officer and relevant health workers, and observations of TB control activities. Priority problems were identified using the Urgency, Seriousness, and Growth (USG) method, followed by root-cause analysis using a fishbone diagram. The coverage of TB case detection and treatment reached 50% against a program target of 90%, resulting in a 40-percentage-point gap. USG analysis identified low TB case detection and treatment coverage as the highest-priority problem, with a score of 15. Fishbone analysis identified interconnected factors, including limited human resources and workload, predominantly passive case finding, limitations in screening activities, limited community and cadre involvement, and challenges in recording and reporting. Alternative solutions included community-based TB education, the use of educational media, and strengthening community health cadre involvement in TB case finding and prevention. TB control at the Mulyorejo Community Health Center has not yet achieved the program target. An integrated approach involving active case finding, community and cadre engagement, health education, treatment adherence support, and improved use of TB program data is needed within the ILP framework.

Keywords: tuberculosis, integrated primary healthcare, community health center, disease control, primary health care

INTRODUCTION

Community Health Centers (Puskesmas) are primary health care facilities that play a strategic role in providing public and individual health services, particularly through promotive and preventive approaches. Under the Integrated Primary Care (ILP) policy, Puskesmas are directed to coordinate life-course-based health services, with an emphasis on early detection, disease prevention, and continuity

of care across programs and sectors. (1) Within this framework, tuberculosis (TB) remains an important priority because of its substantial disease burden and potential for continued transmission.

Tuberculosis remains a major public health problem globally and in Indonesia. Indonesia is among the countries with the highest TB burden worldwide and contributed approximately 10% of global TB cases in 2024. (2) The national TB control program has set targets for improving TB case detection and treatment and achieving high treatment success, emphasizing the importance of timely case finding, appropriate treatment, adherence monitoring, and continuity of care. (3) At the primary health care level, Puskesmas play an important role in translating these strategies into routine services through case finding, treatment, monitoring, and community education.

At the regional level, East Java Province recorded 87,048 TB cases in 2023, representing approximately 93% of the estimated cases, with Surabaya among the districts/cities reporting the highest number of cases. (4) Treatment outcomes also remain an important concern. In Surabaya, 56.02% of patients with bacteriologically confirmed and registered TB cases were reported to have completed their treatment, representing 4,642 of 8,287 patients in 2023. (5) These data indicate the continuing need to strengthen TB control, particularly in case detection and continuity of treatment at the primary health care level.

At the Mulyorejo Community Health Center, the 2024 Community Health Center Performance Assessment (PKP) identified TB case detection and treatment as one of the priority program gaps. The reported achievement was 50% against a target of 90%, resulting in a 40-percentage-point gap. (6) This local performance gap highlights the need to examine the factors underlying TB program performance and to identify feasible strategies for improvement.

The Integrated Primary Care approach provides a framework for strengthening coordination and integration of primary health services, including promotive, preventive, curative, and rehabilitative efforts. (1) In TB control, this approach can facilitate collaboration across service clusters, health programs, cadres, families, and relevant sectors. Therefore, this study aimed to analyze TB control problems at the Mulyorejo Community Health Center and formulate alternative solutions based on ILP principles, using problem prioritization and root-cause analysis to identify areas for program improvement.

METHODS

This research used a descriptive analytical design with a case study approach in the form of a mini project at the Mulyorejo Community Health Center, Surabaya. The study was conducted from October to November 2025 to identify problems in the tuberculosis (TB) control program and formulate appropriate improvement strategies within the framework of Integrated Primary Care (ILP).

The study used secondary data and limited primary data. Secondary data included TB program data from the 2024 Community Health Center Performance Assessment (PKP) of the Mulyorejo Community Health Center, reports on TB detection and treatment coverage, and health profiles of Surabaya City and East Java Province. Primary data were obtained through discussions with the TB program officer and relevant health workers, as well as observations of TB control activities at the primary health care level.

Data collection was conducted through document review, limited discussions with the TB program officer and relevant health workers, and observation of TB service activities at the Puskesmas.

Data analysis was conducted descriptively through several stages. First, priority health problems were identified using the USG method, consisting of Urgency, Seriousness, and Growth, to determine the priority problem in the Mulyorejo Community Health Center working area. The USG scoring was conducted through consensus among the medical trainees, the TB program officer, and the supervising

lecturer. Second, root causes were analyzed using a fishbone (Ishikawa) diagram. Third, alternative solutions were formulated based on ILP principles, with emphasis on promotive and preventive measures, active case finding, and cross-program and cross-sector involvement. Finally, problem-solving recommendations were formulated based on the identified root causes and the context of the health center.

The analysis was guided by an ILP-based framework in which the Community Health Center was considered a coordinator of primary health services. TB control was examined in relation to human resources and facilities, screening and case detection, treatment and adherence monitoring, recording and reporting, and TB case detection coverage. The framework was used to formulate program improvement recommendations rather than to quantitatively assess the level of ILP implementation.

Ethical Considerations

Ethical exemption was granted by the Health Research Ethics Committee, Faculty of Medicine, Universitas Airlangga (No. 49/EC/KEPK/FKUA/2025). The study used aggregate program data and did not involve the collection or use of individual patient identifiers. Data collection and field activities were conducted with permission from the Mulyorejo Community Health Center, Surabaya.

RESULT

TB Program Performance and Problem Identification

Mulyorejo Community Health Center is a primary health care facility serving the Mulyorejo area of Surabaya. The health center conducts tuberculosis (TB) prevention and control activities, including case detection, treatment, treatment adherence monitoring, and routine recording and reporting.

Based on the Community Health Center Performance Assessment (PKP) for January–December 2024, several essential community health program indicators had not reached their respective targets. The TB program was among these indicators, with the coverage of TB cases detected and treated reaching 50% against a target of 90%. Other indicators included smoking among the population aged 10–18 years, management of pregnant women with reactive hepatitis B, toddlers weighed and gaining weight (N/D), and healthy households meeting the 10 PHBS indicators (Table 1).

Table 1. Essential community health program indicators that had not reached the target at Mulyorejo Community Health Center, 2024

No.	Health program indicator	Target (%)	Achievement (%)
1	TB cases detected and treated	90.0	50.0
2	Smoking among population aged 10–18 years	<8.8	25.4
3	Management of pregnant women with reactive hepatitis B	100.0	0.9
4	Toddlers weighed and gaining weight (N/D)	88.0	82.9
5	Healthy households meeting 10 PHBS indicators	56.0	55.4

Source: *Community Health Center Performance Assessment (PKP), Mulyorejo Community Health Center, January–December 2024.*

Among these indicators, TB case detection and treatment was subsequently selected for further analysis because of the gap between the target and the reported achievement. The documented achievement was 50%, compared with the 90% program target, corresponding to a 40-percentage-point gap.

TB Problem Prioritization

Problem prioritization was conducted using the Urgency, Seriousness, and Growth (USG) method. Each identified problem was assessed using a score of 1–5 for urgency, seriousness, and growth. The resulting scores and ranking are presented in Table 2.

Table 2. USG analysis for prioritization of TB-related problems

No.	Health problem	Urgency (U)	Seriousness (S)	Growth (G)	Total score	Rank
1	Low coverage of TB case detection and treatment	5	5	5	15	1
2	Low TB treatment adherence	4	5	4	13	2
3	Lack of active TB screening activities in the community	4	4	4	12	3
4	Community stigma toward people with TB	3	4	4	11	4
5	Limited TB promotion and education media	3	3	3	9	5

Note: Each dimension was scored from 1 (very low) to 5 (very high). U = Urgency; S = Seriousness; G = Growth.

The USG analysis identified low coverage of TB case detection and treatment as the highest-priority problem, with a total score of 15. Low TB treatment adherence received a score of 13, followed by lack of active TB screening activities in the community (12), community stigma toward people with TB (11), and limited TB promotion and education media (9).

Fishbone Analysis of the Priority Problem

The priority problem of low TB case detection and treatment coverage was further analyzed using a fishbone (Ishikawa) diagram to identify contributing factors.

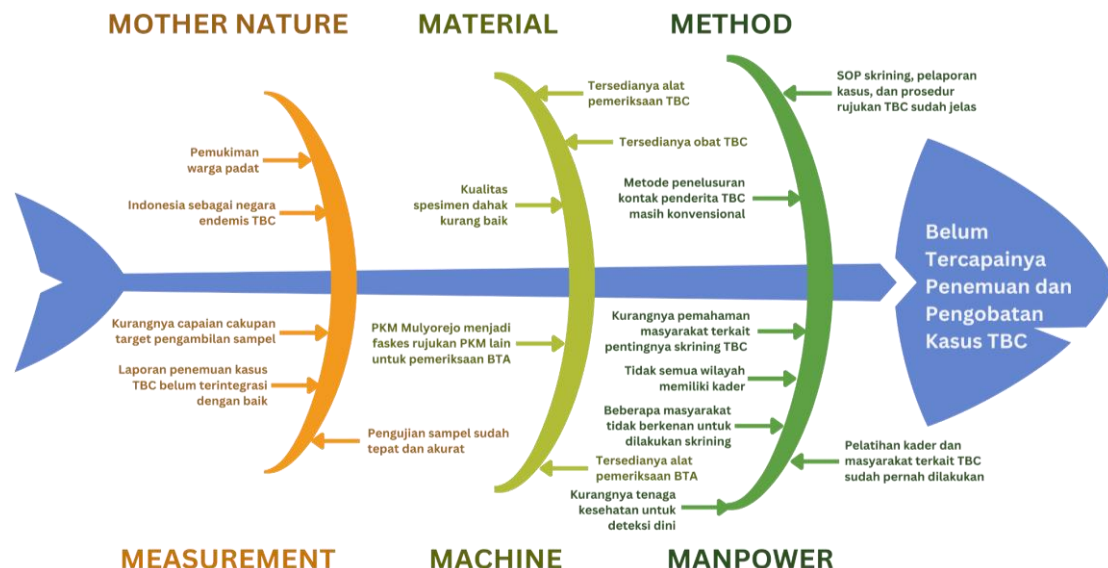


Figure 1. Fishbone analysis of TB case detection and treatment in the Mulyorejo Community Health Center working area, 2024

The fishbone analysis identified several contributing factors related to human resources, equipment, measurement and reporting, environmental conditions, methods, and materials. The analysis indicated that limited human resources and workload, limited community participation and cadre involvement, predominantly conventional or passive case finding, limitations in screening activities, and challenges in recording and reporting contributed to the difficulty in achieving the target for TB case detection and treatment.

The analysis also showed that the available diagnostic facilities, including sputum smear microscopy (BTA) and rapid molecular testing (TCM), were generally available and functional. However, the health center also served as a referral facility for surrounding health centers and clinics, increasing the number of samples processed and potentially extending waiting times when testing demand increased. The capacity of TCM was also identified as a potential limiting factor during periods of high demand.

Regarding the service method, TB case finding was described as still relying substantially on patients presenting to health facilities or being identified through cadres. The use of the e-TB application was limited to health workers, while supervision of sputum collection during screening was considered suboptimal.

Intervention Alternatives

Based on the identified priority problem and contributing factors, several intervention alternatives were considered. These included community-based TB education, the use of educational media, and strengthening the involvement of community health cadres in TB case-finding and prevention activities. The proposed alternatives were intended to strengthen community participation, increase awareness of TB symptoms and screening, and support earlier identification and referral of individuals with presumptive TB.

DISCUSSION

The findings of this study indicate that the coverage of tuberculosis (TB) case detection and treatment at the Mulyorejo Community Health Center remains below the program target, reaching 50% against the target of 90%. This gap indicates that TB case detection and treatment remain important program performance issues at the primary health care level. At the national and global levels, improving TB case detection remains a major component of TB control, as undetected cases may contribute to continued transmission and hinder progress toward TB elimination targets. (2)

From the perspective of primary health care, Puskesmas plays an important role as a gatekeeper and coordinator of health services, with an emphasis on promotive and preventive care, early disease detection, and continuity of care. (1,7) In the present study, TB case detection was found to be predominantly passive, with identification of cases relying largely on patients presenting to health facilities. This approach may limit the identification of individuals who do not seek care despite having symptoms or risk factors for TB. Active case-finding strategies, particularly those involving community-based activities, have been reported as an important approach to complement passive case detection and improve TB case detection. (8,9)

The root cause analysis identified several interconnected factors underlying the low coverage of TB case detection and treatment, including limited human resources, high workload, predominantly passive case detection, limited health promotion media and screening support, community stigma, and challenges in program management and data utilization. These findings indicate that the performance gap cannot be addressed through a single intervention. Instead, improvement requires coordinated interventions addressing service delivery, community engagement, human resources, and program

management. The multidimensional nature of these factors is consistent with a health-system perspective in which program performance is influenced by interactions among inputs, processes, and outputs. (10,11)

Human resource limitations and high workload were identified as barriers to active screening and treatment adherence monitoring. Under these conditions, health cadres and community networks may provide additional support for extending the reach of Puskesmas services. Strengthening the involvement of cadres in TB screening, patient accompaniment, and family education may help extend the reach of Puskesmas services, consistent with evidence on strengthening community health cadres in TB control. (12) Such involvement may support the implementation of community-based activities while maintaining coordination with the TB program at the Puskesmas level.

Service delivery was another important area identified in the analysis. The predominance of passive case detection suggests a need to expand TB screening beyond patients who independently seek TB-related services. Community-based activities and greater involvement of health cadres may complement facility-based case detection by extending screening and referral activities into the community. (9) Active case-finding approaches involving primary health care and community or cross-sectoral support have also been explored as strategies to improve TB case detection. (13)

The analysis also identified limitations in screening activities and health promotion media as barriers to expanding community-based activities. The availability and functionality of BTA and TCM facilities provide an important basis for TB diagnosis; however, increased testing demand may place pressure on diagnostic capacity and potentially extend waiting times. In addition, limitations in screening support and supervision of sputum collection may affect the implementation of active case-finding activities. These findings suggest that strengthening TB control requires not only increasing community-based detection but also ensuring that diagnostic and referral processes can accommodate the additional demand.

Community participation and stigma were also identified as relevant factors. Negative perceptions toward people with TB may discourage individuals from seeking examination or completing treatment. (14) Therefore, TB case-finding strategies need to be accompanied by continuous health education and community engagement. The proposed use of TB educational materials and greater involvement of cadres and community networks is intended to improve awareness of TB symptoms, screening, and referral. Evidence from a community-based case study in Wonogiri also suggests that communication strategies involving cadres, community leaders, and culturally sensitive approaches can support TB treatment adherence. (15) Evidence on the use of visual educational media among health cadres also supports the potential role of accessible educational materials in strengthening cadre knowledge related to TB prevention and early detection. (16)

Management and health-system factors were identified particularly in relation to TB recording, reporting, and data utilization. The limited use of the e-TB application beyond health workers and challenges in routine recording and reporting indicate areas for strengthening program information management. Similar challenges have been described in studies of TB service integration and public-private networks, where coordination among actors and effective interdependence between services remain important for improving TB control. (10,11,17) Strengthening routine review and use of TB program data may support more responsive program planning and implementation.

The findings can also be considered within the framework of Integrated Primary Care (ILP). The ILP policy emphasizes service integration based on health-service clusters and a life-course approach, with Puskesmas functioning as a coordinator of primary health services. (1) In this study, ILP was used as a framework for formulating alternative solutions to the problems identified through USG and fishbone analyses. The proposed interventions, including strengthening community-based TB

screening, increasing the role of cadres and families, community education, and improving the use of TB program data, are consistent with the principles of integrated primary care. (1,10)

However, the available data in this study did not include a formal assessment or quantitative measurement of the level of ILP implementation. Therefore, the findings should not be interpreted as directly demonstrating that ILP implementation at the Mulyorejo Community Health Center is suboptimal. Rather, the identified barriers indicate areas in which the ILP framework can be applied to strengthen TB control. This distinction is important because the study primarily aimed to identify TB control problems and formulate ILP-based alternative solutions rather than evaluate the implementation of ILP itself.

From a regional perspective, TB remains an important public health issue in East Java and Surabaya, providing broader context for strengthening TB control at the primary care level. (4,5) Nevertheless, regional data should be interpreted as contextual information rather than as direct evidence of program performance at Mulyorejo. The local performance finding in this study is based on the Mulyorejo Community Health Center Performance Assessment (PKP) data. (6)

Overall, the findings indicate that the low coverage of TB case detection and treatment at the Mulyorejo Community Health Center is associated with interconnected barriers involving human resources, service delivery, diagnostic capacity, community factors, and program management. The ILP framework provides a basis for addressing these barriers through community-based case finding, community and cadre involvement, health education, improved treatment-support mechanisms, and better use of program data. The effectiveness of these proposed interventions should subsequently be assessed through routine program monitoring using measurable indicators of TB case detection, treatment adherence, and treatment outcomes.

CONCLUSION

Tuberculosis (TB) control at the Mulyorejo Community Health Center in Surabaya has not yet achieved the program target, with TB case detection and treatment coverage reaching 50% against the target of 90%. The root cause analysis identified interconnected challenges involving limited human resources, predominantly passive case detection, limitations in screening activities and supporting facilities, limited community and cadre involvement, and challenges in TB program recording and reporting.

The findings indicate that these challenges require an integrated approach involving community-based active case finding, strengthened community and health cadre engagement, continuous health education, treatment adherence support, and improved use of TB program data. The Integrated Primary Care (ILP) framework provides a basis for organizing these efforts across service clusters and community networks. Further monitoring is needed to assess whether the proposed interventions improve TB case detection, treatment adherence, and program outcomes.

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AUTHOR CONTRIBUTIONS

LD provided academic supervision and contributed to the study methodology and manuscript review. DIMZ, DKF, DA, FJ, FAW, EPW, FRH, and AK contributed to data collection, investigation, data curation, and preparation of the manuscript. RAN contributed to operational supervision, investigation, and manuscript review. EM contributed to supervision and coordination of activities at the Mulyorejo Community Health Center. All authors reviewed and approved the final manuscript.

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