

Short Communication

Translating Tuberculosis Control Policy into Practice: Planning and Budgeting Challenges at a Primary Healthcare Center

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ABSTRACT

Background: Tuberculosis (TB) remains one of the most prevalent communicable diseases in Indonesia, with high morbidity and mortality rates, particularly in urban areas such as Makassar city. **Objective:** This study aimed to examine the planning and budgeting processes of the TB control program at the Tarakan Public Health Center (PHC) in Makassar city. **Methods:** A qualitative descriptive study was conducted via document analysis, direct observations, and in-depth interviews with four key informants (TB programme managers, healthcare workers, and community health volunteers involved in TB control). Thematic analysis was used to identify patterns related to program planning, budgeting, implementation, and barriers to program implementation. **Results:** The TB control programme at Tarakan PHC followed national guidelines but faced local challenges, including insufficient early case detection, limited community awareness, and strong social stigma. Budget allocations fluctuate yearly, with IDR 12,800,000 allocated in 2023 and increasing to IDR 25,000,000 in 2024, affecting the program's sustainability. Patient nonadherence to treatment, often due to perceived recovery, economic hardship, and stigma, was a major barrier. In response, the PHC implemented activities such as active case finding, contact tracing, default tracing, treatment supervision, and preventive therapy, supported by community engagement. Between 2020 and 2024, 226 TB cases were identified. **Conclusion:** Although national policy supports TB control efforts, local implementation is hindered by behavioral, operational, and financial constraints. Consistent budget allocation, targeted health education, and stronger community involvement are essential for improving treatment outcomes and supporting TB elimination strategies at the primary care level.

KEYWORDS

Tuberculosis, primary health care, program planning, health budgeting, treatment adherence, urban health, community engagement, Indonesia

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INTRODUCTION

Tuberculosis (TB) is a communicable disease caused by *Mycobacterium tuberculosis* that primarily affects the lungs but is also capable of affecting other organs [1]. Despite being preventable and curable, TB remains one of the leading infectious diseases worldwide. According to the World Health Organization, TB caused an estimated 1.6 million deaths in 2021, with approximately 10.6 million people falling ill with the disease. However, only 6.4 million (60.3%) were diagnosed and treated, leaving a significant proportion of approximately 4.2 million cases (approximately 39.7%) undiagnosed or unreported [2]. Males account for approximately 56.6% of the global cases, followed by females (32.1%) and children (11.3%) [3,4].

Indonesia continues to bear a heavy burden of TB, ranking second globally in terms of case numbers. Socioeconomic factors such as poverty, high population density, malnutrition, and limited access to quality healthcare exacerbate TB transmission and hinder control efforts [5]. In 2021, Indonesia reported an estimated 969,000 TB cases, a sharp rise from 824,000 in the previous year, with a national incidence rate of 354 cases per 100,000 population [2]. However, detection and treatment coverage remain suboptimal, with only 45.7% of cases identified and managed by the health system [6]. In alignment with the End TB Strategy and Sustainable Development Goals, Indonesia's National Medium-Term Development Plan (RPJMN 2020-2024) outlines ambitious targets for TB elimination by 2030. Key strategies include ensuring universal access to diagnosis and treatment, strengthening surveillance and case monitoring, and improving cross-sector collaboration [7].

Within Indonesia, the highest number of provincial caseloads in 2024 were in West Java (234.710 cases), East Java (116.752), Central Java (107.685), North Sumatra (74.434), DKI Jakarta (70.387), and Banten (50.391). South Sulawesi Province recorded 45,556 cases, making it the top-ranked region outside Java and placing it 7th overall among Indonesia's TB-high-burden provinces. Between January and May 2024, the Provincial Health Office reported 12,280 TB cases, representing 34.2% of the annual target cases. In Makassar city, specific health centers such as Antang and Tarakan have consistently recorded high caseloads [8]. The Tarakan Public Health Center (PHC) was selected as the study site because it serves a densely populated urban area in Makassar city with a high burden of TB. PHCs play a central role in TB diagnosis, treatment, and prevention programs, reflecting the typical operational challenges faced by primary healthcare facilities in similar urban Indonesian settings. Its unique position allows for an in-depth exploration of both systemic and community-level barriers to TB control, providing insights that can inform policy and practice in comparable contexts. Urban environmental risk factors such as poor ventilation, overcrowded housing, and inadequate sanitation further contribute to TB transmission in these communities [9].

Adequate and sustained financing is the cornerstone of effective TB control. The success of national and local TB programs largely depends on the proportion of allocated funds and the ability of healthcare institutions to plan and utilize these resources efficiently [10,11]. However, studies have indicated persistent challenges in planning, budgeting, and disbursement at local health service levels, particularly in public primary care settings [12]. This study aims to examine the planning and budgeting processes of the TB control program at the Tarakan Public Health Center in Makassar city, focusing on identifying barriers and enabling factors in translating policy into practice, as well as the application of health system strengthening approaches that emphasize the role of governance, financing, service delivery, and community engagement in achieving sustainable health outcomes. By understanding the structural, managerial, and financial aspects of TB program implementation, this study provides recommendations for optimizing resource utilization and enhancing the effectiveness of TB control strategies at the primary healthcare.

MATERIALS AND METHODS

Study design and setting

This study utilized a qualitative descriptive approach conducted at the Tarakan Public Health Center in Makassar city, South Sulawesi Province, Indonesia. Data will be collected between January and March 2025 via three main techniques: document analysis, direct observation, and

semistructured interviews. The document analysis included TB program planning documents, implementation reports, and budget allocations from 2020–2024. Direct observations were conducted to understand real-time planning and implementation activities, including community outreach and service delivery. The semistructured interviews involved four key informants: one TB program manager, one healthcare worker responsible for TB services, and two community health volunteers (Table 1). These participants were selected via purposive sampling on the basis of their direct involvement in the TB program in the past year. Each interview lasted 45–60 minutes and was audio recorded with consent.

Table 1. Characteristics of informants at Tarakan public health center

No	Name (Initials)	Gender	Role	Description
1	Ny. A.S.	Female	TB program manager	Informant 1
2	Ny. N.L.	Female	Healthcare workers	Informant 2
3	Ny. R.M.	Female	Community health volunteers	Informant 3
4	Tn. M.D.	Male	Community health volunteers	Informant 4

Data analysis

All interview data were transcribed verbatim and analyzed via thematic analysis following Braun and Clarke's (2006) six-step framework: familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing. The initial coding structure was guided by the key stages of the planning process, such as problem identification, goal setting, resource planning, and strategy implementation. A descriptive analysis was applied to the budget data to illustrate funding trends across the years. Data triangulation was conducted across all sources to improve the credibility of these findings.

Ethical considerations

This study did not undergo a formal ethical review by an institutional ethics committee. However, ethical principles were maintained throughout the research process. Prior to participation, all the informants were provided with an explanation of the study's objectives, and their verbal consent was obtained. The participants were assured of the voluntary nature of their involvement, the confidentiality of their responses, and the right to withdraw at any time. No personal data were recorded or disclosed.

RESULTS

TB Program planning at the Tarakan public health center

Observations and interviews revealed that one of the primary challenges in TB control at the Tarakan Public Health Center was the low level of early case detection and limited community awareness of TB symptoms, such as persistent coughing, fever, and unexplained weight loss. This was supported by a health staff member who stated the following: *"Most people do not know that a cough lasting more than two weeks can be a sign of TB. They usually come when the condition is already severe"* (Informant 2). The situation is further worsened by the stigma surrounding TB, with the disease often being perceived as shameful. Consequently, many patients delay seeking diagnosis or refuse treatment. A staff member explained the following: *"There is still a strong stigma in the community. Some patients are embarrassed about coming to the health center because they think TB is a disgrace"* (Informant 3).

Sputum testing coverage was also found to be low due to limitations in laboratory infrastructure and public reluctance to undergo the procedure. Additionally, nonadherence to treatment remains a critical issue. Many patients discontinue medication midway, often because of perceived recovery or socioeconomic factors, such as cost and access. According to one informant: *"Some patients stop treatment after one or two months because they feel better or cannot afford transportation to the clinic"* (Informant 1). Between 2020 and 2024, 226 TB cases were reported at Tarakan PHC, indicating a persistent burden of tuberculosis in the local

population. Notably, most of these cases involved women over the age of 50, suggesting a possible vulnerability among older female adults in this region. This demographic trend may be linked to several factors, including weakened immunity due to aging, limited access to early screening, low health-seeking behavior, and social or economic dependency on others. The age and sex distribution of cases highlights the need for more targeted TB prevention and education efforts, particularly among older women who may not be adequately reached by current health interventions.

In terms of goal setting, Puskesmas Tarakan follows the strategic directions issued by the Makassar City Health Office. One staff member confirmed this: *“For TB program implementation, everything is already set by the City Health Office. We at the Puskesmas just follow the directions and plans given”* (Informant 1). Despite centralized planning, local health workers conducted situation analyses and community-based surveillance to inform program targets. These efforts involved collecting data on TB incidence, treatment outcomes, treatment dropout rates, and key risk factors such as malnutrition, poor housing conditions, and education levels.

The study revealed that TB control activities at Tarakan PHC were comprehensive and integrated with other public health initiatives in the area. The activities included active case finding, contact tracing, default tracing, monitoring of treatment adherence, and preventive therapy. A TB program manager explained the following: *“We perform four main activities to prevent TB: active case finding, contact investigation, default tracing, and treatment monitoring, including preventive therapy. Each staff member is assigned a specific task”* (Informant 1).

Community engagement and intersectoral collaboration play crucial roles in implementation. Contact investigations were conducted among household members and close contacts of confirmed TB patients. For patients who defaulted on treatment, follow-up home visits were conducted to provide motivation and address barriers. According to a field health officer: *“We visit the homes of patients who stop treatment to encourage them and help with any problems they face, such as cost or family issues”* (Informant 4). Treatment monitoring was performed daily via a direct observed therapy (DOT) approach by health workers or trained community volunteers. Preventive therapy was provided to individuals at high risk, especially household contacts of patients with TB.

Budgeting of the TB control program

An analysis of budget documents and informant testimony revealed fluctuating funding levels for the TB program in the province. The Makassar City Health Office allocated the following amounts: IDR 13,500,000 in 2021, IDR 22,500,000 in 2022, IDR 12,800,000 in 2023, and IDR 25,000,000 in 2024. However, no clear documentation is available to explain the rationale behind these fluctuations. According to the informants, changes were often influenced by shifting priorities at the city level, limited fiscal space, and annual budget negotiation outcomes. A health staff member expressed concern over the inconsistency in budget levels: *“In 2022, we had a good budget. However, in 2023, it dropped significantly, which made it difficult to carry out all planned activities”* (Informant 2).

Despite budget increases in some years, the annual allocation was often insufficient to cover the operational needs of all the program components. Funding was divided into four major activities—active case detection, contact investigation, treatment supervision, and community engagement and education—and was typically planned for 11 months of program execution each year. *“The funds we get from the city health office are divided into these four activities, and we spread them out to cover almost the whole year”* (Informant 1).

Proportionally, a significant portion of the budget (approximately 40–50%) was directed toward active case detection and contact investigation, reflecting a focus on improving early detection. Treatment supervision activities received approximately 25–30% of the budget, whereas community engagement and education efforts were allocated the least, at approximately 15–20%. These proportions suggest that while the program prioritized early case detection, less consistent attention was given to the behavioral and social factors, such as stigma and knowledge gaps, that significantly affect treatment adherence and the program's success. *“Most of the budget is focused on active case finding and contact tracing because we know early detection is very*

important. However, funds for education and stigma reduction are still limited, even though these are crucial to ensure that patients adhere to treatment." (Informant 1) and *"We often feel constrained in conducting community awareness campaigns. More funding goes to technical activities such as case finding and treatment supervision, whereas education efforts that could change behavior and reduce stigma remain underfunded."* (Informant 3).

Barriers to program implementation

In addition to issues related to planning and funding, this study identified several barriers to program implementation at the Tarakan Public Health Center. Although the informants noted that funding availability was generally sufficient, they emphasized more significant challenges in patient behavior and adherence. As one health worker stated, *"There is no major obstacle with the budget, but it is the patients who are sometimes difficult to understand. Some stop taking their medicine once they feel better and never complete their treatment, while others never return for follow-up checkups"* (Informant 2).

A key challenge is the difficulty in influencing patient attitudes and perceptions. Many patients with TB remain skeptical or indifferent to the importance of completing a full course of treatment. Educational efforts explaining the long-term risks of untreated TB and drug resistance are often not fully understood or accepted. Another commonly reported barrier was treatment discontinuation after symptom relief was achieved. Many patients believed that they were cured after a few weeks of medication and subsequently stopped therapy prematurely. This noncompliance increases the risk of multidrug-resistant TB (MDR-TB), complicating future treatment and control efforts. Moreover, patients who abandon treatment are potential sources of ongoing transmission within the community.

Another recurring problem was patients' failure to return for scheduled checkups after diagnosis or treatment initiation. Several informants cited time, transportation costs, and stigma as the key reasons. One staff member noted: *"Many patients feel embarrassed about returning to the clinic because they fear being judged by people in their neighborhood"* (Informant 3). The stigma surrounding TB, particularly in urban settings, significantly negatively impacts treatment adherence. Patients often avoid consistent contact with healthcare providers to maintain their privacy and avoid negative social interactions. Many patients view their health condition, especially an infectious disease such as TB, as deeply personal and private. They try to limit the number of people who learn about their illness to avoid intrusive questions, gossip, or judgments from others. Consequently, they reduce their interactions with others, particularly healthcare providers, to prevent uncomfortable experiences such as being treated coldly, receiving demeaning comments, or facing stigma.

To address these challenges, the PHC team implemented targeted educational efforts using persuasive and culturally sensitive communications. These efforts include persuasive communication, for example, emphasizing positive benefits (*"Completing treatment means protecting your family"*) and showcasing inspiring stories of TB patients who have been cured, and culturally sensitive communication, such as using local dialects, involving community leaders or religious figures, and avoiding language or imagery that could provoke stigma or shame. By combining these two approaches, TB information becomes more readily accepted, emotionally resonant, and effective in encouraging early testing and treatment adherence. They also involved community health workers and local leaders conducting awareness campaigns at the grassroots level by organizing door-to-door visits, small group meetings, and neighborhood events through trusted volunteers and faiths or community leaders. Thus, messages about TB treatment and its importance were delivered in familiar settings, making them more relatable and trusted by the community.

DISCUSSIONS

This study explored the planning and budgeting processes of the tuberculosis (TB) control program at the Tarakan Public Health Center in Makassar city, revealing several strengths and persistent challenges. While the program aligns with national strategic directives, local implementation faces both systemic and behavioral barriers. Systemic barriers refer to structural

and organizational obstacles, such as cumbersome bureaucratic procedures and uneven budget allocations, that impede timely case detection and treatment delivery. Behavioral barriers encompass individual- and community-level factors, such as fear of stigma, misconceptions that mild symptoms do not require medical attention, and nonadherence to treatment regimens for personal or socioeconomic reasons that undermine effective program implementation [1,13,14].

In Indonesia, TB control approaches have become increasingly important, given the high incidence rates across many regions [13]. Various strategies have been implemented, including community education and sociocultural support initiatives. Early detection is key to preventing TB spread. However, several factors contribute to the low early detection rate at Tarakan PHC. One is the community's lack of knowledge about TB, which is a significant risk factor for delayed care-seeking [15]. A previous study revealed that without proper awareness of symptoms such as persistent cough, weight loss, and nighttime fever, many individuals remain unaware of their condition [16].

Moreover, the social stigma surrounding TB severely impacts care-seeking behaviors. Many women avoid screening for fear of being shamed, which further delays treatment [17]. Sociocultural education approaches in South Tapanuli District highlight how stigma and discrimination greatly hamper TB prevention efforts [18]. Patients' reluctance to pursue early diagnosis or adhere to protocols reflects the informational and cultural gaps that must be addressed through community-based health education and tailored communication strategies.

Studies have shown that poor public understanding of TB symptoms can delay care seeking, especially in areas with limited health information [15]. When people do not recognize TB signs, they tend to wait until the condition worsens. Similarly, insufficient outreach strategies can lead to inadequate dissemination of TB information. Interventions involving community education, such as health seminars and informational materials, have been shown to improve knowledge and motivate proactive treatment seeking [19]. Therefore, active community involvement is essential to increase TB awareness and emphasize the importance of early detection. Access to healthcare services also plays a critical role in controlling TB. In rural areas, patients may face barriers such as long distances to facilities and high transportation costs [20]. Poor infrastructure at health centers can hinder early detection efforts [21].

Our findings show that planning at the PHC level is heavily directed by the Makassar City Health Office. While this centralized approach ensures standardization, it can limit primary care facilities' flexibility in adapting their responses to local epidemiological trends. Frontline staff at Tarakan PHC conducts surveillance and community assessments, but these do not significantly influence target setting- or resource allocation, as plans are largely predetermined by city authorities. Nonetheless, using local data to set objectives and plan activities, such as active case finding and contact tracing, reflects operational responsiveness that supports decentralized health governance models.

The implementation of Tarakan PHC from contact tracing to directly observed therapy (DOTS) follows WHO recommendations. However, treatment adherence remains a major challenge. Many patients discontinue treatment prematurely, particularly once symptoms ease, contributing to the growing threat of multidrug-resistant TB (MDR-TB), which is far more difficult and costly to treat. Behavioral challenges are compounded by systemic barriers, such as inconsistent follow-up mechanisms and fluctuating resource availability. Although the TB program receives financial support from the Makassar City Health Office, budget trends have been unstable over the past four years. The funding cut in 2023, despite steady caseloads, highlights the program's vulnerability to changing political and administrative priorities. A top-down-, centrally controlled budgeting process with limited PHC-level- negotiation has produced allocations that often fail to reflect actual TB trends or on-the-ground- needs. This underscores the need for more adaptive, participatory mechanisms in which local data and PHC inputs are considered when determining funding.

From a health policy perspective, there is a need to intensify efforts at the PHC level by integrating health promotion, risk factor control, and treatment as core elements in TB prevention [22]. Integrated programs within the healthcare network can significantly contribute to TB prevention. For example, a study in Purworejo demonstrated that training community

members to produce campaign videos effectively increased adolescents' TB awareness through the use of more engaging and interactive media [23]. This suggests that innovative educational media can facilitate a better understanding of the public.

This study also highlights the importance of community and intersectoral collaboration. By involving local leaders, village officials, and community health volunteers, Tarakan PHC leveraged social capital to extend its reach and improve program acceptance. Patient accompaniment has proven critical in TB control, particularly for MDRTB cases, as support from treatment supervisors helps ensure that patients adhere to their treatment courses [24]. Likewise, communicating in local dialects reinforces culturally appropriate approaches that can bolster both communication effectiveness and patient support [25]. Involving cultural factors in TB control strategies enhances the reach and impact of interventions. Finally, a community-based approach that trains and empowers health volunteers is integral to preventive action. Training local volunteers who possess both community trust and contextual knowledge can promote greater TB awareness and prevention within their communities [26].

In summary, effective TB control in Indonesia requires a holistic approach that integrates education, sociocultural support, and genuine community empowerment. Addressing stigma, improving access to diagnosis and treatment, and fostering collaboration among the government, civil society, and health organizations are critical steps toward achieving sustainable TB control. Although this study provides valuable insights, it is limited by its single-site scope and reliance on self-reported informant data. Future research should incorporate quantitative service data and conduct longitudinal evaluations of patient outcomes.

Public health implications

This study reveals fundamental gaps in tuberculosis control implementation at primary healthcare facilities (*Puskesmas*) that require immediate policy reform. The documented treatment discontinuation rates and persistent stigma barriers threaten Indonesia's End TB Strategy 2030 objectives. Primary healthcare centers require increased autonomy in budget allocation and community engagement strategies to address local epidemiological patterns effectively. The predominance of cases among women aged > 50 years necessitates targeted screening programs for this demographic. Integrating culturally appropriate educational interventions and systematic stigma reduction campaigns into existing *directly observed treatment short-course* (DOTS) protocols is an urgent priority. Health systems must establish performance-based financing mechanisms that incentivize treatment completion and promote community outreach activities. These findings underscore the need for decentralized tuberculosis control approaches that balance national standardization with local operational flexibility to achieve sustainable disease elimination in the Philippines.

Limitations

This study has several limitations, including potential selection bias due to purposive sampling, which may not encompass all perspectives; the lack of interviews with TB patients, which limits direct insights into experiences of stigma, access barriers, and treatment motivation; and the risk of social desirability bias among official staff in interviews, where respondents might provide answers that favorably portray the institution despite triangulation efforts to ensure data consistency.

CONCLUSIONS

Primary healthcare tuberculosis control in Indonesia faces persistent implementation challenges, despite established policy frameworks. The Tarakan *Puskesmas* experience demonstrates that centralized planning combined with fluctuating budget allocations undermines program effectiveness. Treatment adherence is compromised by community stigma and insufficient patient education, while demographic patterns reveal vulnerable populations requiring targeted interventions. Effective tuberculosis elimination demands an integrated approach that combines enhanced primary care autonomy, stable financing mechanisms, and

culturally responsive community engagement strategies. Strengthening local capacity for adaptive program management while maintaining national quality standards represents the optimal pathway for achieving Indonesia's 2030 tuberculosis elimination goals. Future research should employ longitudinal mixed-methods designs incorporating patient perspectives, quantitative treatment outcomes, and multi-site comparisons across diverse Indonesian healthcare settings to validate these findings and develop evidence-based interventions for tuberculosis control optimization.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization, Supervision: M and MR.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization, or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems.

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