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Analysis of Tuberculosis Control Program (*Case Detection)*: Literature Review

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Abstract

Background : To date, tuberculosis remains a contagious disease that can cause health problems in the community. In addition to increasing health risks, TB disease has an impact on the economy of a country and its sufferers. This is certainly hard for a developing country like Indonesia, which is still struggling in many ways besides TB disease. TB disease is an infectious disease caused by Mycobacterium Tuberculosis. TB case finding has the meaning of obtaining an overview through various activities including screening for suspected TB, physical and laboratory monitoring, diagnosing and categorizing the type of patient, so that treatment can be carried out as early as possible so that the patient can recover immediately and not spread to others. There are many factors that can affect the success of the tuberculosis program itself, one of which is the factor in management which includes input, process, output. **Objective:** This paper examines scientific evidence related to the implementation of the tuberculosis program in case detection. **Methods:** This article is based on a search of scientific journals conducted through online databases namely Scopus, Semantic, PubMed and Scholar published in 2020-2025. **Results**: In terms of TB case finding, there are many needs that must be carried out in an effort to get TB cases at health facilities. However, there are obstacles in its implementation, including lack of human resources, ineffective planning, and not optimal recording and reporting systems. **Conclusion:** efforts in TB case finding are highly dependent on the suitability and integration of available inputs, quality in the implementation process, and clear measurement of outputs. Therefore, efforts to improve program effectiveness require improvements in the management of inputs (such as resources and policies), optimization of processes (including more efficient detection and treatment), and continuous evaluation of outputs in TB case finding.

Keywords: *Case Detection*, Indonesia, Tuberculosis

Background

Tuberculosis is an infectious disease caused by Mycobacterium Tuberculosis. Transmission of this disease can be through the sputum of patients affected by tuberculosis. This disease, especially tuberculosis, can affect anyone regardless of age or gender. Globally in 2023, there were 8.2 million cases recorded. This figure increased from 7.5 million in 2022, and 6.4 million in 2021. This is followed by a global TB mortality rate of around 1.25 million in 2023, down from 1.32 million deaths in 2022 and 1.4 million in 2021. The

burden is highest in adult males older than 15 years with an estimated 6.0 million cases while in females older than 15 years there are 3.6 million cases. In the group of children and young adolescents aged 0-14 years, there are 1.3 million cases. Those newly diagnosed in 2022 and 2023 are likely to include people who previously contracted TB in the previous year, but whose diagnosis and treatment were delayed due to COVID-related disorders (Global Tuberculosis Report, 2024).

Currently, Indonesia is the second largest country with tuberculosis disease after India at 10%. TB cases in 2023 amounted to 821,200 cases (74%) or there are still 26% that have not been found, not detected or not recorded. The coverage of TB program success in Indonesia from January to December 2024 is 58% with a target of 80% . To date, tuberculosis is still an infectious disease that can cause health problems in the community. In addition to increasing health risks, TB disease has an impact on the economy of a country and its sufferers. This is certainly hard for a developing country like Indonesia, which is still struggling in many ways besides TB disease. The purpose of TB case finding is to obtain an overview of TB cases through various actions including screening with people suspected of TB, physical and laboratory controls and diagnosing and categorizing the type of TB patient, so that treatment can be carried out as early as possible so that the patient can recover quickly and not spread to others. (WHO, 2024)

In Indonesia, the number of cases in 2023 reached TB case finding in Indonesia was recorded at 724,309 cases in 2022, then increased in 2023 to 821,200 (74%), or there are still 26% of cases that have not been found. Furthermore, MDR/RR TB case finding amounted to 12,482 with 40% coverage. The increase in TB case finding is not followed by good treatment success coverage, which is only 86.5% while the national target is 90%. Indonesia has a target to eliminate TB disease to 65 per 100,000 population in 2030 by making various efforts and requires cooperation from all parties from the government sector, private sector, and involvement from the community so that by 2030 this disease will no longer exist in Indonesia (Kementerian Kesehatan, 2024)

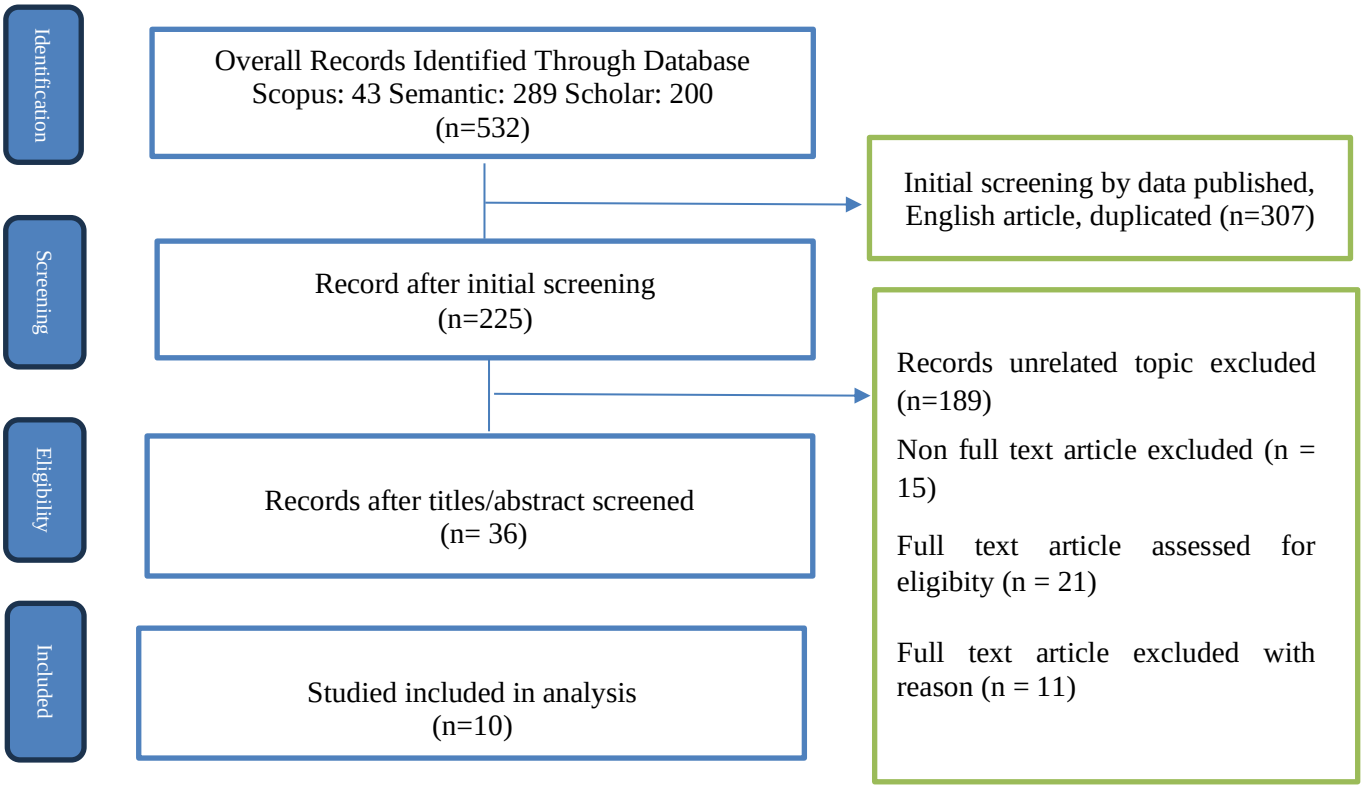
The government has an important role in supporting tuberculosis (TB) case detection through various strategies at the national and regional levels. These include increasing case finding coverage to 90%, community engagement, and strengthening cross-sector and partner collaboration in TB elimination. The government can also provide training facilities for health workers at health centers, hospitals, and private clinics to detect TB symptoms, conduct sputum collection, and report cases to the national system (SITB).In the managerial aspect, strengthening the health system is a top priority. In addition, the government also supports through the provision of health infrastructure, increased access to services for detection and treatment, distribution of diagnostic tools such as the Molecular Rapid Test (TCM), and ensuring the availability of free anti-TB drugs throughout Indonesia.

Methods

The study used the literature review method, which means a study approach that aims to analyze and compile various relevant references, by applying the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) method to produce new conclusions or ideas. Articles and journals used in this study are various data sources

centered on a particular theme using three keywords including tuberculosis, case detection and Indonesia. Searches on scientific articles and journals were conducted through online database: Scopus, Semantic, Publish or Perish and Scholar with a period of 2020 - 2024. In the inclusion criteria, the selected articles or journals had to fulfill several conditions, namely the research had to focus on tuberculosis case detection in Indonesia, use a quantitative or mixed methods approach, and present primary data related to TB cases. Articles must also be written in Indonesian or English. For exclusion criteria, articles will be excluded if they are irrelevant to the topic, only in the form of opinions, editorials, or short reports without empirical data, and focus on TB treatment without discussing case detection aspects.

Below are references to journals that researchers analyzed in the literature review study which can be seen in table 1 which contains the author's name, year of publication, and year of publication, methods used and research results.



Study flow based on PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis

Results

The following are the journal references that researchers chose to analyze in the literature review study shown in table 1.

Table 1. Results of literature review search

No	Author and Research Year	Title	Methods	Population and Sample	Results
1.	Astha Triyono et al, 2023	Tuberculosis Early Detection Application (E-TIBI): A New Paradigm for Finding New Tuberculosis Cases	Quantitative, Descriptive	Total sampling of all East Java residents who filled out the aplication	The self-assessment paradigm based on digital technology is applied in the formation of this E-TIBI application. Through the application, people can quickly find out whether they or others are at risk of suffering from tuberculosis. The findings explain that the E-TIBI application allows the entire community to easily conduct initial screening for tuberculosis.
2.	Darmanto Win, et al, 2023	Efforts to Increase Tuberculosis Case Detection Rate (CDR) in Jombang Regency Through "SIMATB" as a Tuberculosis Screening Application on Risk Factors in Wonosalam Jombang	Outreach *screening*	TB cadre, community	With the large amount of sputum that is a risk factor, it can describe the negative results of *Mycobacterium Tuberculosis* and the SIMATB application can be used as a way to increase the *case detection rate (CDR)* of tuberculosis and further TB screening in District
3.	Suyono Mokhamad et al, 2024	Analysis of Tuberculosis Control (Case Study) in Mojokerto City	Qualitative	Head of the health department, Head of P2P Division, TB Program Manager	The situation with tuberculosis (TB) shows that there is a need to improve case detection, especially in children, and strengthen surveillance and intervention systems, and requires cross-sectoral synergy in reviewing and developing tracing and treatment capacity.

4.	Rifaatul Mahmudah et al, 2023	Overview of CDR, Case Notification Rate and Treatment Success in Tuberculosis Control	Quantitative, Descriptive	All residents of sub-districts with suspected TB cases in Purbalingga District	Among the three districts, Purbalingga had the highest case detection rate (CDR) at 44%, but still did not reach the national target. The average success rate of TB control in the three districts is 28 percent. Thus, it is expected that the government sector, in this case the Puskesmas, can increase the acquisition of case finding and optimize health services in TB control.
5.	Erlianah Siska et al, 2025	Analysis of the Performance of Lung Tuberculosis Cadres towards Increasing the *Case Detection Rate of* Lung Tuberculosis in the Sukarami Health Center Working Area in 2024	Quantitative,	36 TB cadres	It shows that there is a relationship between the competence possessed by cadres (p value 0.04) and tenure (p value 0.02) on the performance of cadres in an effort to increase the case detection rate (CDR) of Pulmonary TB. We recommend that the health center can provide training to cadres in an effort to improve the ability of TB cadres.
6.	Meutia Putri et al, 2025	Analysis of Determinants Associated with Health Worker Performance in Finding Tuberculosis Cases by Contact Investigation	Quantitative, *crossectional*	TB Program Manager at Puskesmas, 90 homecare nurses	It was found that there is a ability, clarity, assistance, incentives, validity and environment on health workers' performance in *Case Detection Rate (CDR)* through contact tracing.

7.	Rifaatul Mahmudah et al, 2023	Overview of CDR, Case Notification Rate and Success Rate in Tuberculosis Control	Quantitative,, descriptive	All members of the population of sub-districts with suspected TB cases in Purbalingga, Banyumas and Banjarnegara districts	The highest average CDR achievement among the three districts is Purbalingga with a rate of 44%. However, this figure is still relatively low as it has not reached the national target of 70%. The low CDR rate may be due to various obstacles in case finding, such as the limited number of staff in charge of managing case finding, TB determination, and officers managing the TB program. In addition, the low CDR could also be influenced by the suboptimal recording and reporting system in the region.
8.	Aulia Tsarwah et al, 2020	Implementation of a Community-Based Tuberculosis Case Finding Strategy	Qualitative	Informants were 6 TB program managers, cadres and community leaders.	It shows that passive TB case finding occurs when suspects come to health facilities to have their health condition checked, while active case finding is done by examining household and non-household contacts of individuals who show symptoms of TB. Screening is carried out by inviting health facilitators to provide information related to TB disease to the entire community and cadres.

9.	Silwanus Kaku et al, 2024	Tuberculosis Case Finding in Kulon Progo District, Yogyakarta, Indonesia: Passive versus Active Case Finding Using Mobile Chest X-ray	Retrospective review of TB case notification data	All notified TB cases in Kulon Progo district	In rural areas, active case finding using mobile chest X-rays is more common than passive case finding. Therefore, there is a need to increase case-finding activities to identify more TB cases, especially those with subclinical TB.
10.	Salsabila Azzahrain et al, 2023	Detection of Tuberculosis in Toddlers and Risk Factors at Puskesmas Perak Timur Surabaya	*Case Control*	Case population of pediatric patients aged 0-5 years clinically diagnosed with pulmonary TB (through the use of X-ray and tuberculin tests Control population of pediatric patients aged 0-5 years who received medical care	At Puskesmas Perak Timur Surabaya, 12 pediatric patients aged 0-5 years were clinically diagnosed with pulmonary TB. The factors that influence the spread of TB bacteria include the physical condition of the house and the immune system. Home conditions associated with the incidence of TB in toddlers are room temperature.

Discussion

Tuberculosis is an infectious disease with high incidence in all segments of society. TB has a wide impact on the quality of life and economy and even threatens the safety of human life. TB is an infectious disease caused by the germ *Mycobacterium Tuberculosis*. TB can be suffered by anyone, adults or children and can spread to all organs of our body, although the most attacked is the lung organ (Kemenkes RI, 2023) . In efforts to detect cases of tuberculosis (TB), the *case detection* rate (CDR) is often hindered by other interrelated factors. One of the main obstacles is the lack of public understanding of the symptoms of TB. Many people do not realize that a chronic cough, fever, or weight loss can be symptoms of tuberculosis. As a result, these symptoms are often dismissed as minor illnesses that will go away on their own, so they do not seek treatment or further examination.

In addition, the social stigma against tuberculosis contributes to the situation. In some communities, TB is still seen as a shameful and contagious disease, so patients feel ashamed to seek treatment or disclose their condition. This fear of discrimination can cause patients to delay or even stop treatment before it is completed, which increases the risk of transmission and hinders the discovery of new cases. This is in line with research conducted by Ayu Rosi'ah et al, that someone with suspected TB status experiences unfavorable stigma, therefore TB suspects feel embarrassed by the surrounding community with this situation (Ayu et al., 2020)

In the context of TB control program management, the input, process, and output aspects serve to ensure that the program runs effectively and can achieve its goals. The first step in starting a TB control program is to ensure that all necessary resources are available. This includes medical personnel who are trained and ready to handle TB patients, such as doctors, nurses, and health cadres. In addition, the program also requires a sufficient budget to purchase quality TB drugs, support the operations of hospitals and health centers, and to implement extension programs. This is in line with the research of Susanto et al, (2019) which states that there are several factors that influence the discovery of TB cases, such as inadequate resources, lack of training, multiple jobs for officers, infrastructure such as inadequate examination facilities. This causes the implementation of case finding to be less effective and achievements to be low. In addition, health resources are limited, either in terms of trained medical personnel or available cadres. In some health facilities, the number of medical personnel skilled in diagnosing TB is very limited, while equipment such as sophisticated sputum tests or x-rays are not always available in health facilities. Taken together, these factors interact to create a major bottleneck in TB case-finding efforts. To address this, a more holistic approach is needed, from raising public awareness to improving access to health services and increasing diagnostic capacity at medical facilities (Susanto, 2019)

Based on research conducted by Rifaatul Mahmudah et al, it proves that TB cases have decreased due to the impact of the COVID-19 pandemic, which has caused the TB control program to be neglected. The target achievement is still low and has not reached the national target of 70%. The low achievement of the CDR rate can occur due to obstacles in case finding such as low staff to organize people in case finding, TB determination and TB program holder officers and is also caused by the recording and reporting system in the region (Mahmudah & Setiyabudi, 2023).

A planning concept expressed by Koontz, Cyril & Heinz (1996) states that planning bridges the gap between the current state and the desired state in the future. Understanding this understanding, it is likely that non-optimal planning will affect the desired target in the form of achieving the TB *Case Detection Rate*. The process aspect

begins with early detection or screening by starting routine examinations at available health facilities such as health centers, hospitals, and clinics. This aims to find TB cases early, so that treatment can be started immediately and the patient does not infect others. Another thing that was done by Mulya (2023), in the successful implementation of TB control program policies in areas that have highlands and swamps such as facilities / infrastructure and health workers are not adequate so that the TB elimination strategy process has not run optimally. However, in lowland or urban areas, program achievements have been good. Outputs in the form of Success Rate at Puskesmas from 33% to 100% and Multi Drug Resistant TB (MDR-TB) amounted to 16 cases. From this it can be concluded that to achieve the expected output, it must synergize and run effectively from the input and process (Mulya, 2023).

The Government of Indonesia's steps to control tuberculosis (TB) have been outlined in various national policies and regulations. One of them is Presidential Regulation (Perpres) No. 67 of 2021 on Tuberculosis Control, which includes TB elimination targets, national strategies, division of responsibilities between central and regional governments, cross-sector coordination, community participation, monitoring and reporting mechanisms, and financing aspects. Operationally, the government seeks to improve access to health services capable of detecting TB cases, strengthen laboratory surveillance systems, and expand the utilization of diagnostic technologies. At the local level, policy implementation may include the formation of TB response acceleration teams, training of human resources, and strengthening coordination between sectors. However, policy implementation in the field is faced with challenges such as limited resources, uneven infrastructure, and low reach of socialization to the grassroots level. Overall, the government's strategy reflects a comprehensive approach, ranging from a firm national policy direction to technical implementation in the field. However, the success of the program is largely determined by joint commitment, inter-sectoral synergy, and active community involvement. The development of further studies can provide in-depth insights into the implementation dynamics and ongoing innovations in TB elimination efforts in Indonesia.

Conclusion

Tuberculosis (TB) control is a global health challenge that requires an effective and sustainable managerial approach. In this analysis, it has been found that the management of the TB control program in Indonesia still faces various obstacles that affect its effectiveness. These constraints include a lack of coordination among relevant agencies, limited trained human resources, and low public awareness of the importance of early detection and appropriate treatment of TB. Overall, this analysis shows that the successful management of the TB control program depends on the synergy between the government, medical personnel, and the community. Therefore, human resource capacity building, improved inter-sectoral coordination, and wider education and socialization are expected to strengthen the implementation of this program in the future. The success of TB disease control depends on the suitability and integration of available inputs, the quality of process implementation, and clear measurement of outputs. With a good coordinator, clear regulations, and adequate facilities, it is expected that the incidence of TB will be significantly reduced and the disease will eventually be eliminated. The TB program coordinator at the health facility in each region plays an important role in *Case Detectioon Rate* (CDR) case finding, from detection to treatment, will not be successful without the discovery of TB patients.

Increasing the Case Detection Rate (CDR) of tuberculosis (TB) in Indonesia requires a strategic and implementable approach. One of them is strengthening the capacity of health workers through standardized ongoing training. This training should include clinical aspects such as symptom identification, specimen collection techniques, and treatment management as well as psychosocial approaches to improve educational and supportive capabilities for patients and their families. In addition, the use of digital technology is an important innovation in accelerating case detection. The development of a mobile application for TB screening that is integrated with the national health information system can facilitate symptom reporting, contact tracing, and real-time treatment monitoring. Investment in health infrastructure is also crucial, especially in the 3T (underdeveloped, frontier, and outermost) regions. This includes equitable distribution of diagnostic facilities, provision of tools such as TCM and PCR, and improved transportation access to health services. Community empowerment through public education also plays an important role in reducing TB stigma, by involving community leaders, TB survivors, and local organizations. Applying these measures as a whole will support the achievement of the national TB elimination target by 2030.

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