ANALYSIS OF TUBERCULOSIS CONTROL (CASE STUDY IN THE CITY OF MOJOKERTO) YEAR 2024

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Abstract

This study aims to analyze the tuberculosis (TB) situation in Mojokerto City, focusing on the increase in cases among children and identifying effective countermeasures. TB, a preventable and curable infectious disease caused by Mycobacterium tuberculosis, is particularly problematic in developing countries like Indonesia due to high incidence and mortality rates, necessitating a comprehensive control strategy. Employing qualitative methods, this research delves into the practices, perceptions, and social dynamics affecting TB control efforts in Mojokerto, illuminated by the latest data showing a significant increase in pediatric TB cases and the public health situation. Findings reveal a TB incidence rate of 385 per 100,000 inhabitants, a case detection rate of 75%, and a notably high pediatric TB case proportion of 32%. The effectiveness of case tracking by health centers varies, with an average of only 54% receiving Tuberculosis Preventive Therapy (TPT). Major obstacles include limited access to radiology services, social stigma, and the need for adequate health facilities. Innovations such as the "Mbak Desi Fights TB" program and enhanced cross-sector cooperation are deemed crucial to strengthen control strategies. The study concludes that a multifaceted strategy is essential for combating TB in Mojokerto, which should include enhanced case detection, health system strengthening, and community integration in control efforts. Increased collaboration across sectors and advancements in research and development are expected to accelerate TB elimination. This research offers efficient recommendations to improve TB control strategies, based on an in-depth analysis of the current conditions and social dynamics in Mojokerto.

Keywords: Tuberculosis, Mojokerto City, case detection, Tuberculosis Preventive Therapy (TPT), social stigma, sector collaboration, TB research.

Introduction

Tuberculosis (TB) is a disease caused by the bacterium Mycobacterium tuberculosis, which most commonly affects the lungs (Espinal, 2003). TB spreads through the air when a person with pulmonary TB coughs, sneezes, or spits. A person only needs to inhale a few germs to become infected. According to data from the World Health Organization, around 10 million people contract TB each year (Au et al., 2005). Although preventable and curable, this disease causes death for 1.5 million people annually, making it the infectious disease with the highest death rate in the world. TB is also the leading cause of death among people with HIV and a major contributor to antimicrobial resistance. Approximately a quarter of the global population is estimated to have been infected with TB bacteria, but only a small fraction develop the disease (Knight et al., 2019). Those infected but not ill cannot transmit it. However, those infected with TB bacteria have a lifetime risk of 5-10% of falling ill with TB. This risk increases for people with weakened immune systems.

In Indonesia, the TB situation is also concerning. The country ranks third after India and China in the number of TB cases (Zhang et al., 2023). Tuberculosis is one of the top ten infectious diseases causing death, even more than HIV/AIDS. In 2017 and 2018, the number of deaths from TB reached 116,000 and 98,000, respectively, with 75% of TB patients being in the productive age group of 15 to 55 years.

In East Java, from January to October 2022, the region ranked eighth for treatment coverage at 49.56% compared to the national rate of 49.43%, including about 4,408 cases of pediatric TB (55.43%), 74% of TB RO cases starting second-line treatment, 1,245 cases (3.7%) with TB-HIV burden, a treatment success rate of 82.79%, and a 55.51% treatment success rate for TB RO, resulting in 1,660 deaths (5.04%).

The situation in Mojokerto City, despite achieving 100% of the minimum service standards for TB (Implementation of Minimum Service Standards for Tuberculosis) with 688 cases found and treated out of a target of 600 cases, this paper will specifically focus on the discovery of TB patients in Mojokerto City area because there appears to be a significant problem: in Mojokerto City itself, there is a significant increase in pediatric TB cases where in total there is an increase of 103% (from 84 to 171 cases), including nine times more in Gunung Gedangan Village (from 1 to 9 cases), seven times more in Kedundung Village (from 4 to 7 pediatric TB cases), and five times more in Magersari Village (from 2 to 11 cases). The proportion of pediatric TB cases compared to all cases in 2021 was 31.3% and in 2022 it was 25.9%, which is above the target of only 5%, indicating that there are still sources of transmission that need to be identified and treated to break the chain of transmission.

The Indonesian government has issued policies to strengthen TB control, including Presidential Regulation No. 67 of 2021 on TB, the Minister of Health Regulation No. 67 of 2016 on TB control, the Minister of Health Regulation No. 4 of 2019 on technical standards for fulfilling Basic Service Quality in Minimum Service Standards (SPM) for health, and the Governor Regulation No. 50 of 2022 on TB control.

The author aims to explore the implementation of tuberculosis control in Mojokerto City through a qualitative approach. The purpose of this study is to obtain an in-depth overview of practices, perceptions, and social dynamics that influence TB control efforts. It is hoped that the results of this study can provide efficient recommendations and valuable inputs to improve tuberculosis control strategies in the city (Terwee et al., 2007).

Research Methods

The research design is qualitative (Forman et al., 2008), utilizing a case study method and gathering data through in-depth interviews and secondary sources from the Tuberculosis Information System and the Health Profile of the Mojokerto City Health and Family Planning Office. Informants include:
1) The Head of the Mojokerto City Health and Family Planning Office
2) The Head of Disease Prevention and Control Division
3) The Sub-coordinator of Disease and Vector Control
4) The Sub-coordinator of Health Promotion
5) The Village Head of Magersari
6) The Village Head of Gunung Gedangan
7) TB Program Manager at Gedongan Health Center
8) TB volunteers at Gedongan and Kedundung Health Centers
9) Active TB patients at Gedongan and Kedundung Health Centers
10) The Head of the Mojokerto City Zakat Administration Body

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11) The East Java Provincial Health Office Representative

The variables under study include TB control strategies referenced in Presidential Regulation No. 67 of 2021, which addresses the following strategies:
1) Strengthening Commitment and Leadership at the Central, Provincial, and City Government levels
2) Enhancing the Quality and Patient-Centered Access to TB Services
3) Intensifying Health Efforts for TB Control
4) Enhancing Research, Development, and Innovation in TB Control
5) Increasing Community Involvement, Stakeholder Engagement, and Multi-sectoral Collaboration in TB Control
6) Strengthening Program Management

After collecting interview data, transcription and coding will be conducted to determine whether the above strategies have been implemented, are still in process, or are facing obstacles, through a matrix (Musselwhite et al., 2007). Secondary data will be analyzed in tabular form to find the case detection rate, the proportion of pediatric TB cases compared to all ages from 2021 to 2023 by neighborhood, data on healthy homes by neighborhood for 2023, and TB control funding from 2021 to 2023 from village funds, the health department, and the global fund, also organized in tables (Szczech et al., 2008).

Data analysis will combine findings from both secondary data and in-depth interviews referring to the strategies outlined in Presidential Regulation No. 67 of 2021 to see if they have been executed, are in process, or are facing obstacles, and then interpreted by the researcher (Cole et al., 2018). For data validation, secondary data and other supporting data will be used.

This research has received ethical approval from the Universitas Indonesia Maju Indonesia, with approval number 701/SPm/DKN/FIKes/UIMA/II/2024.

Results and Discussion

Table 1. TB Case Tracking and Preventive Therapy Administration in Mojokerto City, 2023

Puskesmas	Total Population	Total TB Cases	Pediatric TB Cases	Estimated	Case Detection Rate	Percentage of Pediatric TB	Contact Investigation Conducted for Symptomatic TB			TB Disease	Number of Contact Investigations for Asymptomatic Individuals	Percentage of Contact Investigations	Contacts Given TPT per Contact Investigation		% Total
							(< 5 yo)	(>= 5 yo)	total			90	(< 5 yo)	(>= 5 yo)	
Puskesmas Wates	19305	46	10	74	62	22	1	38	39		39	85	19	46	49
Puskesmas Kedundung	22475	71	24	87	82	34	4	60	64		64	90	40	62	63
Puskesmas Gedongan	21392	77	22	82	94	29	2	38	40	2	38	49	23	58	61
Puskesmas Blooto	23217	65	19	73	46	26	2	50	52		50	77	20	33	40
Puskesmas Mentikan	25197	80	23	97	82	28	4	57	61	1	64	80	37	55	58
Puskesmas Kranggan	21257	46	16	82	56	34	4	60	64		11	24	5	42	45
Total	132843	385	125	511	449	32	26	243	269	3	266	69	144	34	54

Source: System Information Tuberculosis 2023

From Table 1 above, it can be noted that only 69% of TB patients underwent case tracking, with the highest percentage at the Kedundung Health Center (90%), followed by the Wates Health Center (85%) and the Mentikan Health Center (80%). Meanwhile, Health Centers that conducted case tracking below 50% are the Gedongan Health Center

(49%) and the Kranggan Health Center (24%). Subsequently, after tracking, only 54% received Tuberculosis Preventive Therapy.

According to the interview with informants, there is an obstacle for X-ray examinations, which is that the execution of X-rays can only be performed at hospitals with a referral (Vandeleur et al., 2008). For most referrals, the BPJS health insurance is used, where a referral to a hospital requires a diagnosis that necessitates a referral. Consequently, as shown in Table 2, the coverage of Tuberculosis Preventive Therapy (TPT) is only 54%, with the lowest TPT provision rate in the age group of 5 years and older being 13.9%. Additionally, other factors affecting the implementation of case tracking include stigma, both towards the residential environment and in the workplace, where close contacts are reluctant because if diagnosed with TB, they fear being ostracized and even losing their jobs.
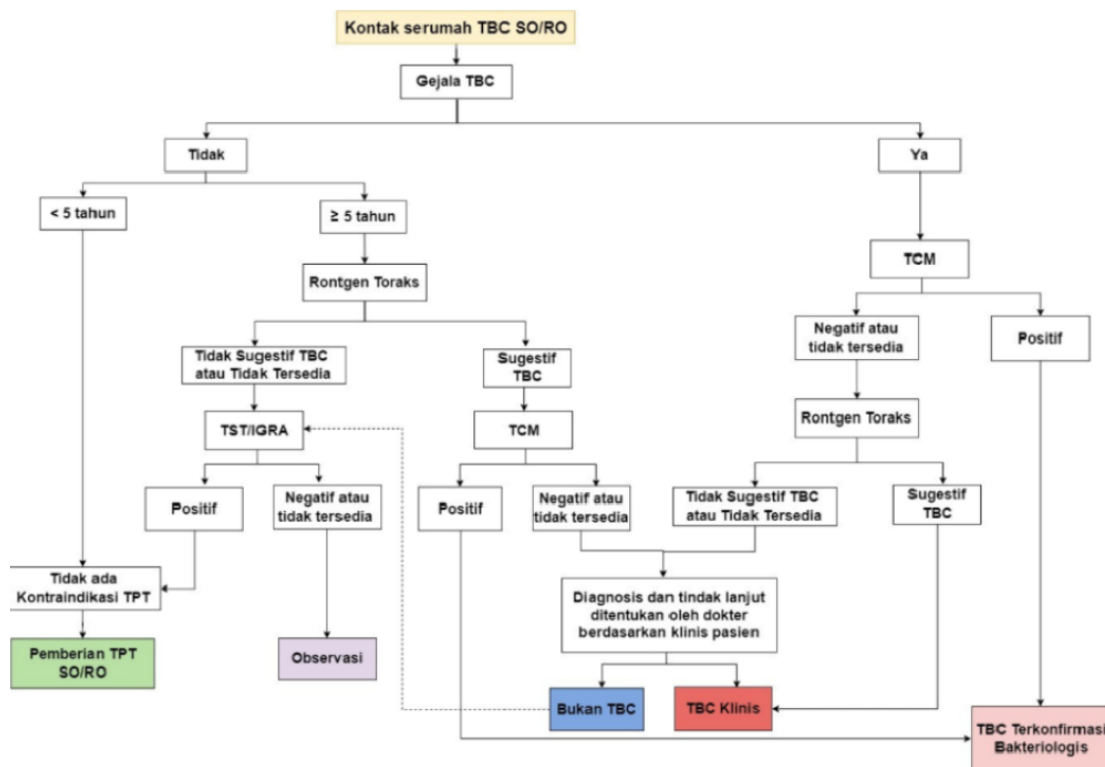
Figure 1. The flow of Latent Tuberculosis Infection (LTBI) examination for household contacts of TB SO/RO patients according to the Circular of the Director General of Disease Prevention and Control No.: HK. 02.02/C/2175/2023 regarding the changes in the implementation of contact investigation and the examination flow of Latent Tuberculosis Infection (LTBI) and the administration of Tuberculosis Preventive Therapy (TPT) in Indonesia

Referring to Figure 1 above, it can be noted that close contacts aged ≥ 5 years who are asymptomatic should undergo thoracic X-ray examinations. However, currently at the Health and Family Planning Office, access to thoracic X-rays is only available at hospitals, and there is no mobile X-ray facility available yet.

Table 2. Access to Healthy Housing per Neighborhood in Mojokerto City, 2023

No	Subdistrict	Village	Health Center/ Puskesmas	Total House holds	Household Air Quality Management (Number)	Household Air Quality Management (%)	Healthy Household Access (Number)	Healthy Household Access (%)
1	Magersari	Wates	Wates	6830	5316	77.83	4479	66
2	Magersari	Gunung Gedanga	Kedundung	2700	2510	92.96	2510	92.96
3	Magersari	Kedundung	Kedundung	5367	4336	80.78	4336	80.78
4	Magersari	Balongsari	Gedongan	2733	2324	85.03.00	2105	77
5	Magersari	Gedongan	Gedongan	816	672	82.35.00	680	83.27.00
6	Magersari	Magersari	Gedongan	2000	1818	90.88	1818	90.88
7	Magersari	Purwotengah	Gedongan	580	494	85.22.00	494	85.23.00
8	Kranggan	Sentanan	Gedongan	737	566	71.89	566	71.89
9	Kranggan	Jagalan	Gedongan	1009	865	85.75	865	85.75
10	Kranggan	Kranggan	Kranggan	4594	3549	77.25.00	3549	77.25.00
11	Kranggan	Meri	Kranggan	3017	2562	84.09.00	2562	84.91
12	Kranggan	Miji	Mentikan	2957	2425	82.02.00	2425	82.02.00
13	Prajuritkulon	Mentikan	Mentikan	2248	1785	79.03.00	1785	79.39.00
14	Prajuritkulon	Kauman	Mentikan	1075	672	62.05.00	650	60.41.00
15	Prajuritkulon	Pulorejo	Kranggan	2878	2392	83.11.00	2392	83.11.00
16	Prajuritkulon	Surodinawan	Blooto	2983	2680	89.85	2983	100
17	Prajuritkulon	Prajuritkulon	Blooto	2733	2677	97.93	2677	97.93
18	Prajuritkulon	Blooto	Blooto	2390	2170	90.79	1946	81.41.00
	Total			47697	39814	83.47.00	38821	81.39.00

Source: 2023 Health Profile of Mojokerto City

From Table 2 above, it can be observed that the access to Healthy Housing in Mojokerto City is 81.39%. For the Gunung Gedangan neighborhood, access to Healthy Housing is 92%, in Kedundung it is 80%, and in Magersari it is 90%. For neighborhoods with access below 80%, the proportion of pediatric TB cases is also greater than 5%. The research results also indicate a strong positive correlation between the coverage of healthy housing and the discovery of tuberculosis cases ($p = 0.01 < 0.05$; $r = 0.68$).(3) the results of the assessment of TB control strategy implementation in Mojokerto City, based on Presidential Regulation No. 67 of 2021, can be described as follows:

Strategy 1: Strengthening the Commitment and Leadership of Central, Provincial, and Municipal Governments

Outcome: Implementation of annual coordination meetings attended by stakeholders.

Enhancing TB control efforts indeed requires intensification and a more specific focus on this topic (Wejse, 2015). Currently, the meetings held do not fully concentrate on TB issues, partly due to the ongoing process of forming a TB Acceleration Elimination Team at the city level in Mojokerto. The existence of this team is expected to bolster TB control efforts by providing a dedicated platform to address various challenges in TB elimination.

Once this team is established, significant progress is anticipated across various aspects. These include the execution of more organized TB elimination campaigns, which not only raise awareness but also mitigate the social and workplace stigma associated with TB. Moreover, the team will focus on improving the quality of life for TB patients through the provision of healthy housing and improved nutritional intake, which are critical factors in recovery and prevention of TB spread.

Cross-sector involvement will also be key in these efforts, given that TB control requires more than just health sector interventions but also support from various entities, including local governments, community organizations, the private sector, and the general public (Trencher et al., 2013). With close cooperation between these sectors, the TB elimination efforts in Mojokerto are expected to be more effective and comprehensive.

Strategy 2: Enhancing Access to Quality, Patient-Centered TB Services

Outcome: Availability of sensitive and specific diagnostic facilities for TB accessible to the entire population.

Challenges in accessing Radiology or X-ray services, particularly for individuals over 5 years old, represent a significant barrier to enhancing TB case detection. Radiology facilities for TB screening can impede the process of rapid and accurate diagnosis, which is crucial for TB management.

The use of mobile radiology facilities could be an effective solution to address this issue. With greater mobility, these facilities can bring radiology services closer to those in need. This will expedite the TB screening and diagnosis process, particularly for individuals over 5 years old, thus allowing for quicker diagnostic confirmation.

The presence of mobile radiology facilities not only enhances TB case detection coverage but also plays a crucial role in the overall TB elimination strategy. It allows for more rapid and accurate interventions, reduces the risk of further transmission, and ensures that treatment can begin as soon as possible. To realize this, support from various stakeholders, including the government, health organizations, and the community, is vital for the provisioning and operation of mobile radiology facilities.

Outcome for Infrastructure Enhancement: Increased capacity of service facilities (strengthening infrastructure development, laboratories, and TB RO service expansion). A network has already been established between clinics and private practice doctors in Mojokerto for the detection and treatment of TB patients, and in 2024, the Mojokerto City Health and Family Planning Office is preparing healthcare facilities for Drug-Resistant TB, to be managed by Dr. Wahidin Sudiro Husodo Hospital in Mojokerto.

Strategy 3: Intensification of Health Efforts for Tuberculosis Control

Output: Implementation of activities for intensification and integration of TB patient discovery at every Health Service Facility.

Although TB-DM (Diabetes Mellitus) and TB-HIV programs have been operational, there remains a shortfall in access to training as well as monitoring and evaluation activities for pulmonologists, internists, and pediatricians. Currently, participation in these activities tends to be limited to TB program managers at hospitals. However, several initiatives, such as the KOPI TBC and meetings featuring speakers from the East Java Provincial Health Office and pulmonologists from Mojokerto City, have been organized to address these issues.

Output: The conduct of active, institution- and community-based patient discovery activities through contact tracing and mass screening in areas with a high TB burden.

Output: Availability of facilities and access to quality management and treatment for all types and forms of TB (pulmonary/extrapulmonary, drug-sensitive/drug-resistant) without discrimination based on age group and HIV status.

Output: Availability of Tuberculosis Preventive Therapy (TPT) medications, and the implementation of TPT.

Despite efforts involving clinics, independent doctors, and TB cadres in detecting cases, the process of examining index cases still faces challenges, particularly related to the need for X-ray examinations requiring hospital visits. This constraint is not only associated with distance and time but also the referral process through the BPJS health insurance that requires a complicating case condition. An urgent solution is needed for this issue. To support this, there is a need for wider case tracking, involving various

sectors, providing TB preventive therapy, and conducting specific monitoring and evaluation activities to address these issues.

Strategy 4: Enhancing Research, Development, and Innovation in TB Control

In Mojokerto City, an innovation known as "Mbak Desi Berantas TBC" (Ms. Desi Fights TB) has been launched. This program involves weekly disinfectant spraying activities at TB patients' homes to reduce transmission risks. Uniquely, this activity is run by the community with funding from the local village funds, showcasing a collaborative approach between local government and the community in combating TB. This initiative targets not only the reduction of disease spread but also strengthens community participation in public health efforts.

Strategy 5: Enhancing the Role of Community, Stakeholders, and Multisectoral Involvement in TB Control

Output: The number of districts/cities implementing integrated TB elimination acceleration actions.

TB Elimination Acceleration Actions: This effort is ongoing with the goal to be implemented in all districts/cities by 2024. This process begins with the formation of TB elimination acceleration teams and the development of local action plan documents, which are currently in progress and expected to demonstrate sustained commitment to integrated TB control.

Strategy 6: Strengthening Program Management

Output: Achievement of all performance and managerial indicators for TB Control activities for Health Service Facilities and individual performance indicators for health cadres.

Output: Achievement of the expected contribution criteria in reaching the TB Control targets at the national and local levels.

Mojokerto City has demonstrated impressive achievements in TB control, receiving awards at the East Java Province level for the past three years. This reflects the dedication and collective efforts in combating TB in the city. However, there are areas that still need improvement, particularly in terms of specifically recognizing health service facilities (both government-managed and private), community organizations, and cadres. While Mojokerto City has made significant progress, more specific recognition and appreciation for individuals and entities directly involved in TB management, especially during significant moments like National Health Day, have yet to be fully implemented. This indicates that there are still opportunities to enhance motivation and recognition for all parties directly involved in TB control efforts in Mojokerto City.

From the strategies and outputs presented, several major issues and efforts that need immediate attention in TB control, particularly in Mojokerto City, have been identified:

Expansion of Focus and Intensification of Efforts: While progress has been made, TB-related meetings need to be more focused and specific, pending the formation of the TB Elimination Acceleration Team. This team is expected to strengthen control efforts with more organized campaigns and improved quality of life for patients.

Enhancement of Diagnostic Service Access: Barriers to accessing Radiology/X-ray services, especially for individuals over 5 years old, highlight the need for mobile radiological facilities to expedite the screening and diagnostic process.

Cross-Sector Involvement: TB elimination strategies require support and cooperation across sectors to enhance control efforts, including the provision of preventive therapy and activities for monitoring and evaluation (Murphy et al., 2012).

Innovation and Community Participation: Programs like "Mbak Desi Berantas TBC" illustrate the importance of innovation and community participation in TB control efforts, which require ongoing support.

Recognition and Appreciation for Contributors: Although Mojokerto City has received provincial-level awards, there is a need for more specific recognition of health service facilities, community organizations, and cadres contributing to TB management (Black et al., 2024).

Strengthening of Program Management: There is a need to strengthen TB program management, including achieving performance indicators for health service facilities and health cadres, as well as contributing to national and local TB control targets (Rijke et al., 2014).

Solutions to these issues involve an integrated approach that includes strengthening government commitment, enhancing access to quality services, intensifying health efforts, innovating, and strengthening community participation and program management. Through coordinated efforts across sectors and recognition of all involved parties, TB elimination efforts in Mojokerto City are expected to be more effective and comprehensive.

Discussion

Research and data on the tuberculosis (TB) situation in Mojokerto City reveal several crucial findings that necessitate a thorough discussion to identify effective mitigation steps:

TB Incidence and Case Detection Rates: The high incidence rate of TB in Mojokerto City indicates a need for improvement in the case detection rate. Findings about the high proportion of pediatric TB cases in several neighborhoods underscore the need for more focused detection and treatment strategies for adult age groups. Global best practices highlight the importance of robust surveillance systems and targeted interventions to identify and treat TB cases, especially in at-risk populations.

Case Tracking Efforts: The effectiveness of case tracking by health centers varies, signifying the importance of evaluating and enhancing case tracking capabilities. Effective implementation of Tuberculosis Preventive Therapy (TPT) is key in prevention efforts. Challenges related to radiological examinations and their impact on case detection, as well as social stigma, are major obstacles in TB control efforts. The World Health Organization (WHO) emphasizes the importance of addressing these barriers through improved access and community acceptance of TB treatment.

Access to Healthy Housing: The correlation between access to healthy housing and TB case detection emphasizes the importance of good living conditions as part of the TB control strategy. This aligns with WHO recommendations on infection prevention and control in high-risk settings.

Implementation and Effectiveness of TB Control Strategies: An evaluation of TB control strategy implementation should include strengthening government commitment and improving access to TB services. The importance of innovation and community involvement, as demonstrated by the "Mbak Desi Berantas TBC" initiative, indicates the need for collaborative and innovative approaches in TB control.

Need for Facilities and Resources: The demand for more sensitive diagnostic facilities and adequate infrastructure for TB treatment underscores the importance of investing in health resources. This is consistent with recommendations to enhance healthcare service capacity in detecting and treating TB.

Recommendations and Next Steps: Addressing the challenges in TB control in Mojokerto City requires enhanced cross-sector collaboration and increased research and development. As outlined in the literature, global and local efforts must be synchronized to achieve effective control and elimination of TB.

Integrating research data with best practices and recommendations from reputable sources like the WHO, this discussion offers insights for formulating comprehensive and sustainable TB control strategies in Mojokerto City.

Conclusion

The research on the Tuberculosis (TB) situation in Mojokerto City reveals the need for improvement in case detection, especially among children, and the strengthening of surveillance systems and interventions. The variability in the effectiveness of case tracking by health centers, challenges in Tuberculosis Preventive Therapy (TPT), and obstacles such as social stigma and access to radiological examinations indicate the need for evaluation and enhancement of tracking and treatment capacities. The correlation between access to healthy housing and case detection emphasizes the importance of good living conditions in control strategies, in line with WHO guidelines. The implementation and effectiveness of countermeasures highlight the importance of collaborative approaches and innovations, such as the "Mbak Desi Berantas TBC" initiative, as well as increased investment in health facilities and resources. Cross-sectoral synergy and increased research are required to achieve effective and sustainable TB control and elimination in Mojokerto, integrating global best practices with local conditions.

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