




Empowering inmates in Surabaya penitentiary to prevent tuberculosis through education and screening programs

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Abstract

Tuberculosis (TB) remains a significant public health issue, particularly in high-risk settings such as penitentiaries. This community service aimed to enhance TB awareness and management among inmates at the Surabaya penitentiary, East Java, Indonesia. The educational method employed was an interactive talk show, allowing participants to actively engage through question-and-answer sessions, discussions, and relevant case studies. This approach sought to improve participants' understanding and involvement, making the information more comprehensible and applicable to daily life. The program also included TB screening for inmates. Results showed a significant increase in participants' TB awareness. The percentage of participants able to correctly identify TB symptoms significantly improved, demonstrated by their ability to recognize common signs like prolonged cough, fatigue, and night sweats. Understanding of TB transmission also drastically increased, with 70% of participants realizing that TB spreads through airborne droplets when an infected person coughs or sneezes. Furthermore, awareness regarding TB prevention measures such as maintaining hygiene, mask usage, seeking early medical care, and adherence to treatment rose to 70%. These findings highlight the effectiveness of the educational program in reducing TB transmission and improving health within correctional facilities. Therefore, continuous implementation of similar programs in various penitentiaries is crucial for tackling TB in vulnerable populations and preventing its spread to the wider community.

Keywords: Tuberculosis; Penitentiary; Education; Screening; Inmates

Pemberdayaan narapidana di Lembaga Pemasyarakatan Surabaya untuk mencegah tuberkulosis melalui program edukasi dan skrining

Abstrak

Tuberkulosis (TB) masih menjadi masalah kesehatan masyarakat, terutama di lingkungan berisiko tinggi seperti lembaga pemasyarakatan. Pengabdian kepada masyarakat bertujuan untuk meningkatkan kesadaran dan penanganan TB di kalangan narapidana di Lembaga Pemasyarakatan Surabaya, Jawa Timur, Indonesia. Metode yang digunakan dalam penyuluhan adalah dalam bentuk talkshow interaktif, di mana peserta dapat berpartisipasi secara aktif melalui sesi tanya jawab, diskusi, serta studi kasus yang relevan. Pendekatan ini bertujuan untuk meningkatkan pemahaman dan keterlibatan peserta, sehingga materi yang disampaikan lebih mudah dipahami dan diterapkan dalam kehidupan sehari-hari. Program ini juga dilakukan skrining TB bagi narapidana. Hasil menunjukkan adanya peningkatan signifikan dalam kesadaran peserta terhadap TB. Persentase peserta yang mampu

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mengidentifikasi gejala TB dengan benar meningkat secara signifikan. Hal ini ditunjukkan dengan kemampuan untuk mengenali tanda umum seperti batuk berkepanjangan, kelelahan, dan keringat malam. Pemahaman tentang transmisi TB juga meningkat drastis, dengan 70% peserta menyadari bahwa TB menyebar melalui droplet udara saat penderita batuk atau bersin. Selain itu, kesadaran mengenai langkah-langkah pencegahan TB seperti menjaga kebersihan, penggunaan masker, mencari perawatan medis lebih awal, dan kepatuhan terhadap pengobatan meningkat hingga 70%. Temuan ini menyoroti efektivitas program edukasi dalam mengurangi penularan TB dan meningkatkan kesehatan di lembaga pemasyarakatan. Oleh karena itu, implementasi berkelanjutan dari program serupa di berbagai fasilitas pemasyarakatan sangat penting untuk menanggulangi TB di populasi rentan serta mencegah penyebarannya ke masyarakat luas.

Kata Kunci: Tuberkulosis; Lembaga pemasyarakatan; Edukasi; Skrining; Narapidana

1. Introduction

Tuberculosis (TB) remains one of the high prevalent infectious diseases globally, ranking as the leading cause of mortality from infectious diseases ([World Health Organization, 2024](#)). Despite significant advances in TB control, it continues to affect high-risk populations disproportionately, particularly in incarcerated settings ([Cords et al., 2021](#); [World Health Organization, 2023](#)). Prisons are recognized as high-risk environments for the transmission of TB due to factors such as overcrowding, inadequate ventilation, limited access to healthcare services, and the high incidence of pre-existing health conditions among inmates. In addition, the limited education and awareness regarding TB prevention and treatment among incarcerated individuals further exacerbate the spread of the disease. In this context, penitentiaries like the Surabaya Penitentiary in East Java, Indonesia, present significant challenges in controlling TB ([Cords et al., 2021](#)). Tuberculosis not only affects physical health but also has significant psychosocial implications for those affected. Therefore, a comprehensive approach is essential to improve the quality of life of TB patients in high-risk environments such as correctional facilities ([Pratiwi et al., 2023](#)).

In 2018, over 11 million people were incarcerated worldwide, with this figure increasing by 24% from 2000 to 2018, affecting nearly all global regions ([Fair & Walmsley, 2024](#)). In particular, Africa and Asia, which have the highest global burdens of tuberculosis (TB) and HIV, saw significant increases in their incarcerated populations – 29% in Africa and 38% in Asia during these years ([Mabud et al., 2019](#); [Santos et al., 2021](#); [Sy et al., 2022](#)). Due to overcrowding in prisons, the prevalence of risk factors for TB, and limited access to healthcare services, including diagnostics and treatment, the transmission of TB is widespread, and prisoners are at high risk of developing the disease, including drug-resistant forms ([Aguiar et al., 2024](#); [Warren et al., 2018](#)). However, much is still unknown about the extent of TB and the rate of *Mycobacterium tuberculosis* infection in prisons across different regions ([Asgedom et al., 2023](#); [Martinez et al., 2023](#)). Previous systematic reviews examining TB in high-risk populations have generally included only a few studies, focusing mainly on specific subgroups (e.g., people living with HIV) or a narrow range of TB-related outcomes ([Placeres et al., 2023](#)).

Indonesia is one of the countries with a high TB burden, and the health risks in its prisons are compounded by the country's overcrowded correctional facilities ([Kementerian Kesehatan RI, 2021](#)). The Surabaya Penitentiary, as many other Indonesian prisons, faces significant challenges, including overcrowded cells, limited access to proper healthcare

services, and a lack of preventive measures. These conditions create a fertile environment for the transmission of TB among inmates, as well as the potential for the disease to spread to the surrounding community upon release ([Walter et al., 2022](#)).

The primary focus of this community service initiative is to address these challenges by improving TB awareness and management among the inmates at the Surabaya Penitentiary. TB is a preventable and treatable disease, and education plays a critical role in reducing its transmission and improving health outcomes. However, inadequate knowledge about the disease, its symptoms, and its transmission dynamics often prevent inmates from seeking timely treatment and adopting preventive measures. Furthermore, lack of information regarding post-treatment care, along with fears of transmitting, can contribute to anxiety among TB patients. Misconceptions about TB treatment and the importance of completing the full course of therapy can lead to treatment non-adherence, further exacerbating the spread of the disease. Additionally, these misconceptions can contribute to psychosocial issues, such as increased anxiety, social stigma, and feelings of isolation, which may negatively impact patients' mental well-being and their willingness to seek or continue treatment ([Yuniartika et al., 2022](#)). This initiative sought to address these gaps by providing a comprehensive educational program that focused on enhancing the knowledge and attitudes of inmates regarding TB. The program included information on TB symptoms, transmission routes, prevention strategies, and the critical importance of adherence to treatment. Through structured educational sessions, the initiative aimed to equip inmates with the necessary knowledge to recognize TB symptoms early, seek timely medical attention, and adopt preventive measures such as maintaining proper hygiene and using protective masks when symptomatic. Furthermore, screening and early detection were emphasized, with symptomatic inmates encouraged to undergo TB tests to facilitate early diagnosis and treatment.

The importance of addressing TB in penitentiaries extends beyond the health of incarcerated individuals; it also has broader public health implications ([Kementerian Kesehatan RI, 2021](#); [Walter et al., 2022](#)). Prisoners are often in close contact with a variety of people, including correctional staff, visitors, and family members, which creates a risk for TB transmission to the general population. Therefore, controlling TB in prisons is not only a matter of inmate health but also an essential component of national TB control efforts. This project aims to reduce the risk of TB outbreaks in the Surabaya Penitentiary by empowering inmates with the knowledge and resources they need to prevent and manage the disease effectively ([Walter et al., 2022](#)).

Studies have consistently shown that the burden of TB in prisons far exceeds that of the general population. In a global analysis, an extremely high incidence and prevalence of TB among prisoners across multiple regions, with the most pronounced disparities observed in South America, as well as in the WHO African, Eastern Mediterranean, and South-East Asia regions. According to [Velen & Charalambous \(2021\)](#), tuberculosis has the prevalence of greater than 1000 per 100 000 prisoners in all regions. Despite these alarming figures, incarcerated populations remain underrepresented in international TB guidelines and national tuberculosis control programs, which tend to prioritize other high-risk groups, such as individuals living with HIV and household contacts of TB patients. This gap in prioritization may contribute to the sustained high transmission rates of TB in correctional settings, underscoring the urgent need for targeted intervention strategies ([Cords et al., 2021](#)).

Given the high prevalence of TB in Indonesia and the unique challenges of correctional facilities, this community service project provides a timely and valuable intervention. By improving TB knowledge and promoting early detection and treatment adherence, the initiative has the potential to significantly reduce the burden of TB within the Surabaya Penitentiary and prevent its spread to the broader community. This paper will present the methodology, results, and implications of the project, shedding light on the effectiveness of educational programs in reducing TB transmission in high-risk environments such as penitentiaries.

2. Method

The implementation method for this community service activity involves a multi approach centered on community empowerment and active participation. This method was chosen to ensure that the community are not only passive recipients of information but are active contributors to their own health and well-being. The project utilized a pre-test and post-test design, a commonly used approach for evaluating the impact of educational interventions. This design allowed the measurement of knowledge and attitude changes before and after the implementation of the TB awareness program. The method consisted of several stages, including population selection, pre-test assessment, implementation of an educational program, and post-test evaluation.

2.1. Participants

The target population for this project consisted of inmates at the Surabaya Penitentiary. A total of 70 inmates were selected to participate in the empowerment program, with recruitment based on voluntary consent. Participants were screened for inclusion based on their willingness to engage in the project and their ability to understand the educational content provided.

2.2. Pre-test assessment

A comprehensive pre-test was administered to the participants before the intervention. The pretest consisted of a questionnaire designed to assess the inmates' baseline knowledge regarding TB. Key topics covered in the questionnaire included general knowledge about tuberculosis, including its etiology, transmission, and symptoms. Additionally, the questionnaire assessed awareness of TB screening methods, attitudes toward TB treatment and adherence, knowledge of preventive measures such as hygiene and vaccination, and previous exposure to TB-related educational materials. The pre-test aimed to establish a baseline for understanding the current level of awareness and to identify specific areas of misconception or lack of knowledge.

2.3. Intervention

The main component of the intervention was an educational program designed to improve inmates' knowledge of TB and its management. The program consisted of several elements. Educational sessions were held to focus on key aspects of TB prevention, symptoms, and treatment. These sessions were led by trained health professionals who utilized audiovisual aids, handouts, and interactive discussions to engage participants. Screening and medical check-ups were also conducted during the program, where inmates were encouraged to undergo medical evaluations. Those identified as at risk or symptomatic were referred for further medical evaluation and care. To maximize reach and foster a collaborative learning environment, selected

inmates who demonstrated high knowledge and interest in the program were trained as peer educators. These peer educators were encouraged to share information and support fellow inmates in understanding and managing TB. Additionally, to ensure sustained participation and engagement, the project offered incentives such as certificates of completion and small rewards. Fun games were also incorporated to increase active involvement in the educational sessions and screenings.

2.4. Post-test assessment

Following the completion of the intervention, the same questionnaire was administered to participants as a post-test to assess the change in knowledge, attitudes, and practices regarding TB. The post-test aimed to evaluate whether the educational intervention had a measurable impact on inmates' understanding of TB and whether it influenced their willingness to engage in preventive practices and seek treatment.

3. Results and Discussion

3.1. Demographic characteristic

Of the 70 participants who took part in the project (Table 1), the majority were male (98.6%) with an average age ranging between 31–45 years (38.6%). Most participants had limited formal education, with only 17.1% (12 participants) being unemployed, and the highest educational attainment for many was secondary school (45.7%), while a small number (1.4%) had completed postgraduate studies. Additionally, a significant proportion were entrepreneurs (54.3%), reflecting a diverse range of occupational backgrounds.

Table 1. Participants characteristics

Variable	Category	n	%
Gender	Man	69	98.6
	Woman	1	1.4
Age	18 – 30	18	25.7
	31 – 45	27	38.6
	46 – 60	21	30.0
	> 60	4	5.7
Last Education	No school	2	2.9
	Elementary school	16	22.9
	Junior high school	11	15.7
	Senior high school	32	45.7
	Bachelor degree	8	11.4
	Postgraduate	1	1.4
Work	Government employee	1	1.4
	Private sector employee	16	22.9
	Entrepreneur	38	54.3
	Student	1	1.4
	Retiree	2	2.9
	Unemployed	12	17.1

3.2. Preparation stage

The preparation stage involved identifying knowledge gaps among inmates and developing targeted educational materials. An initial survey and pre-test were

conducted to assess their baseline understanding of TB (Figure 1). Coordination with correctional facility authorities ensured smooth program implementation.



Figure 1. Distribution of questionnaires to participants

3.3. Implementation stage

The implementation phase began with an educational intervention focused on tuberculosis (TB). Medical professionals and public health experts led interactive sessions, utilizing presentations, videos, and question-and-answer segments to cover key aspects of TB, including its symptoms, transmission, prevention, and the importance of treatment adherence. Participants actively engaged, posing questions about medication side effects and prevention strategies. Following the educational component, a TB screening program was carried out, during which inmates exhibiting symptoms were identified and referred for further evaluation.

3.4. Evaluation stage

Pre-test results highlighted significant knowledge gaps regarding tuberculosis among inmates. Specifically, 70% were unaware that TB spreads through airborne droplets, mistakenly believing it was transmitted via casual contact. Additionally, 70% of participants incorrectly thought that completing the full course of TB treatment was unnecessary for recovery. These misconceptions underscore the critical need for structured education, as a lack of awareness about TB transmission and treatment adherence can severely impede prevention and control efforts. Similar knowledge deficits have been observed in other vulnerable populations, emphasizing the necessity of repeated educational interventions (Yousif et al., 2021).

Following the educational session, post-test findings showed marked improvements. Understanding of TB transmission increased by 70%, with most participants correctly identifying airborne transmission, representing a 40% improvement from the pre-test. Awareness of prevention measures also improved by 70%, as participants demonstrated enhanced understanding of hygiene practices, proper mask usage, and the importance of seeking early medical intervention. The alignment between the pre-test's focus on treatment adherence and the post-test's emphasis on prevention awareness highlights the intervention's effectiveness. These findings demonstrate the impact of structured education in correcting TB-related misconceptions, ultimately contributing to better treatment compliance and disease prevention. These results are consistent with previous research, which found that structured educational programs significantly boost TB awareness and treatment adherence (Yousif et al., 2021). A similar initiative in Sudan

also demonstrated a significant increase in TB knowledge post-intervention, further emphasizing the effectiveness of targeted educational strategies.

Beyond quantitative measures, qualitative feedback indicated positive behavioral changes. Inmates reported a heightened sense of responsibility for their health, with many expressing an intention to seek medical attention sooner if they experienced TB symptoms. Peer educators observed an increase in TB-related discussions, suggesting a ripple effect of knowledge dissemination. Peer-led education played a crucial role in sustaining knowledge transfer. Training selected inmates as peer educators was found to improve TB awareness and detection rates (Adane et al., 2019). Therefore, future programs should incorporate structured peer education modules to enhance long-term impact and foster shared responsibility for health within correctional facilities.

3.5. Implications for TB control in correctional facilities

The significant improvement in TB awareness underscores the importance of integrating structured educational programs into routine prison healthcare services. Implementing peer-led education and regular screenings can enhance sustainability and ensure long-term knowledge retention. Expanding such initiatives across correctional facilities could contribute to better TB prevention and control in high-risk environments.

The concurrent use of TB screening and the widespread educational program guaranteed that at-risk individuals received preventative medical care. Screening as an early detection is essential for effective TB control (Pape et al., 2024). Within enclosed prison settings, prompt identification and management of TB cases are important to prevent the risk of outbreaks that can occur with delayed diagnosis. Routine screening programs need to be integrated into correctional health services to facilitate identification and management of TB cases (Charalambous et al., 2023). Additionally, further fostering collaborations with public health institutions would promote access to resources and encourage sustainable screening within the correctional system (Araujo et al., 2024). The systematic screening and treatment of TB in inmates has proven to be effectively reducing the prevalence and mortality according to prior community empowerment program conducted by Rodgerd & Morasert (2024).

The results of this community service project demonstrate the effectiveness of targeted educational interventions in improving tuberculosis (TB) knowledge and management practices in high-risk populations such as incarcerated individuals. The significant increase in TB awareness, particularly regarding symptoms, transmission, prevention, and treatment adherence, highlights the potential for educational programs to play a key role in TB control within penitentiaries. The project also underscores the importance of incorporating interactive and engaging elements, such as peer education and screening, to ensure sustained participation and encourage behavioral change. Inmates who became peer educators not only increased their own knowledge but also served as valuable resources for disseminating information to their fellow inmates (Cords et al., 2021).

While this project has been successful in improving knowledge and attitude, there are limitations that should be noted. The participants of this program was limited to one penitentiary in Surabaya which may not reflect the national diversity of prisoners in Indonesia. Moreover, this program used self-reported data, which may be subject to response bias. Future interventions should aim to extend beyond a single penitentiary or institution and include additional penitentiaries. Longer follow-up periods between

the baseline and follow-up assessment could also provide valuable information about the lasting effects of educational intervention ([Haeusler et al., 2022](#)). Moreover, incorporating TB prevention and treatment training into the overall medical curriculum in prisons would potentially help institutionalize this process while also ensuring sustainability in the long run.

In summary, this community service has succeeded in increasing knowledge and awareness regarding tuberculosis (TB) for inmates in the Surabaya Penitentiary and providing a practical approach for improving education in high-risk environments. These findings also indicate that TB-awareness campaigns and interventions promoting early diagnosis and with social support to ensure treatment adherence, can help limit the risk of TB transmission within penitentiaries and to the outside community. This result is consistent with prior studies with similar methods conducted by [Yousif et al. \(2021\)](#), which found that post-intervention, there was a significant improvement in all aspects of TB knowledge tested. It highlights the need for educational efforts and peer-based programs to support TB education and management in correctional settings. This leads into continued work to close the gaps in knowledge among prison inmates and guarantee that they obtain the required health care assistance to prevent this transmittable disease. Furthermore, prevention and prompt treatment after diagnosis must be implemented to limit transmission to the general population ([Asgedom et al., 2023](#)).

4. Conclusion

This community service project successfully improved TB knowledge and awareness among inmates at the Surabaya Penitentiary, demonstrating the effectiveness of educational interventions in high-risk settings. The results suggest that increasing TB awareness, promoting early detection, and encouraging treatment adherence can significantly reduce the risk of TB transmission within penitentiaries and the broader community. The project highlights the importance of educational programs and peer-led initiatives in fostering a more informed and proactive approach to TB prevention and management in correctional facilities. Continued efforts are necessary to address the gaps in TB knowledge and ensure that inmates receive the necessary healthcare services to combat this preventable disease.

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Authors Contribution

Program organizer: FAN, RNR, KS, GNS; Article preparation: MA, AE, RNR, MA; Analysis: MA, RNR; Results: KS, GNS; Article revision: GR.

Conflict of Interest

All authors declare no financial or non-financial conflicts of interest related to this article.

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