



Factors Affecting the Success of the National Tuberculosis Control Program in Hospitals in Indonesia Based on the National Hospital Accreditation Standards (SNARS): A Scoping Review

Figi Bayu Joko Saputro¹, Farid Agushyvana^{1*}, Sutopo Patria Jati¹

¹Faculty of Public Health, Universitas Diponegoro, Semarang, Indonesia

*Email correspondence : agushyvana@gmail.com

<p>Track Record Article</p> <p>Accepted: 21 March 2024 Revised: 25 January 2024 Published: 26 March 2024</p> <p>How to cite : Saputro, F. B. J., Agushyvana, F., & Jati, S. P. (2024). Factors Affecting the Success of the National Tuberculosis Control Program in Hospitals in Indonesia Based on the National Hospital Accreditation Standards (SNARS): A Scoping Review. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 6(1), 548–561.</p>	<p style="text-align: center;">Abstract</p> <p><i>Tuberculosis (TB) is an infectious disease that is one of the leading causes of health problems worldwide and in developing countries. Hospitals have a very important role in the success of Tuberculosis control programs. Tuberculosis prevention and control encompass a range of health initiatives that are designed to safeguard public health, mitigate morbidity, disability, and death rates, disrupt the spread of the illness, combat medication resistance, and alleviate the adverse consequences associated with Tuberculosis. This scoping review aims to assess the factors that influence the success of the national tuberculosis control program in hospitals based on the National Hospital Accreditation Standards. A scoping review was conducted in this work, utilizing four databases: Google Scholar, Ebsco, Pro Quest, and Science Direct. The PRISMA Flowchart is a tool used to guide the process of selecting research publications. The inclusion exclusion criteria in the article search were limited to the last 10 years, starting from 2014 to 2023. The results of the scoping review showed that the factors influencing the success of the national tuberculosis program in hospitals based on the National Hospital Accreditation Standards are health promotion, early detection of tuberculosis or health screening, tuberculosis surveillance, risk factor control, surveillance of tuberculosis case finding and treatment, provision of immunity with vaccines and provision of tuberculosis preventive drugs. And in an effort to enhance the effectiveness of the Tuberculosis program, the government, hospitals, and communities should prioritize the implementation of the Directly Observed Treatment Shortcourse program in hospitals to ensure its smooth execution</i></p> <p>Keywords: Tuberculosis, Hospital, Program</p>
--	---

INTRODUCTION

Tuberculosis remains a public health issue that poses a global challenge. Tuberculosis disease, if not treated promptly or incompletely, can lead to dangerous complications and death (Heidary et al., 2022). Indonesia ranks second only to India in the number of Tuberculosis (TB) cases according to the Global Report on Tuberculosis 2022 with a total of 543.874 reported TB cases. The prevalence of TB in Indonesia, based on bacteriological evidence, is 759 cases per 100.000 population (WHO, 2022).

One of the Indonesian government's efforts in controlling TB cases is by implementing the "National Tuberculosis Program" which is a comprehensive program that aims to control and prevent the spread of TB in the country. The program is implemented through various strategies and activities, including hospital accreditation, surveillance, monitoring and evaluation, health promotion, risk factor control, TB case detection and treatment, drug

administration, and collaboration with other health service providers (Ministry of Health of the Republic of Indonesia, 2020).

In the context of TB services, hospital accreditation plays a crucial role in strengthening TB control programs (Oktamianti et al., 2021). Hospital accreditation has been shown to have a positive impact on the quality of care in a variety of healthcare settings, including TB care (Albert et al., 2017; Lee et al., 2021; Oktamianti et al., 2021).

Accreditation programs help ensure that hospitals meet certain standards and provide safe and effective care and accredited hospitals can provide higher quality care and better patient safety (Alkhenizan et al., 2011; Lee et al., 2021). Hospitals that have obtained accreditation possess enhanced capabilities to effectively facilitate the national tuberculosis laboratory network and offer dependable assistance to the national tuberculosis control and treatment program (Albert et al., 2017).

The National TB Program faces challenges in its implementation, including issues related to accessibility of health services, coordination and collaboration among various health service providers and stakeholders, and gaps in TB reporting, especially among certain populations such as children and refugees (Ministry of Health of the Republic of Indonesia, 2019). Based on the description above, researchers are interested in reviewing how the success of the national tuberculosis program in hospitals based on the national standard of hospital accreditation (SNARS).

METHODS

The method used in writing this article is scoping review. The search instrument used was Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021) or the process of searching and assessing article eligibility. The search begins by entering the page <https://scholar.google.com>. The keywords used in the article search were: "Tuberculosis" AND "Hospital" AND "Accreditation". After the list of articles was obtained, the screening process was continued to the title and abstract. The inclusion exclusion criteria in the article search were limited to the last 10 years, starting from 2014 to 2023.

The process of extracting and identifying articles was based on inclusion and exclusion criteria. The inclusion criteria for articles were factors affecting the success of the national tuberculosis program in Indonesian hospitals related to hospital accreditation, scientific and research articles, English language documents, Indonesian language documents, publication years 2014-2023, available full text and open access, quantitative, qualitative, or systematic review research methods. While the exclusion criteria of articles are not related to the success

of the national Tuberculosis program or not in hospitals, not scientific and research articles, documents not in English or Indonesian, published outside the years 2014-2023 and not available full text and not open access, descriptive research methods.

At the beginning of the data search, 81 articles were deemed appropriate, consisting of 63 articles in English and 18 articles in Indonesian, then 18 article titles with relevant titles were selected. The next step was to exclude 9 articles because: 2 articles with the same title, 4 articles published outside 2014-2023, 2 articles are not open access, and 1 is not an article. Then 9 articles were screened based on the title and abstract. The result is 5 articles that are suitable for synthesizing. The most widely used research methodologies in the 5 synthesized articles were mixed-method (2 articles), 1 literature review article, and 2 quantitative articles. Cross-sectional data collection techniques were used in 3 articles, and 1 article used cohort data.

Selection of articles with Literature Searching using databases, manual searching or gray literature or identification of relevant literature. The information source item explains the source of the literature search used. There are 4 databases used to search for relevant articles in compiling this scoping review, namely Google Scholar, Ebsco, Pro Quest, Science Direct.

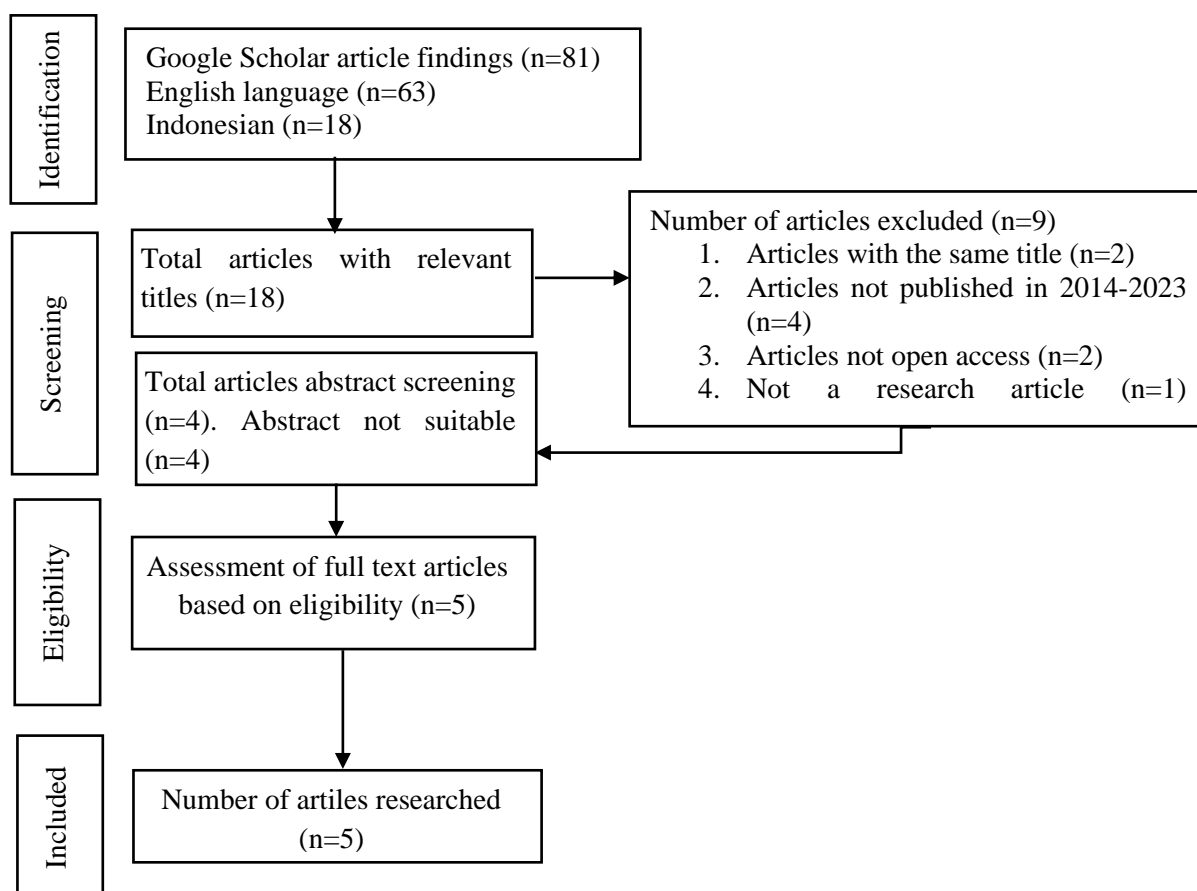


Figure 1 Flowchart of article extraction process

RESULTS

The findings of the evaluation Five papers have been chosen and classified depending on their quality. The first classification is based on the features of the articles, which are categorised by nation and research methodologies:

Table 1. Author Data, Research Results, and Findings

Number	Title, Author and Year	Country	Research Type	Result
1	Tuberculosis control within Indonesia's hospital accreditation (Oktamianti et al., 2021)	Indonesia	Literature review	Health promotion, Tuberculosis surveillance, risk factor control, detection and treatment of Tuberculosis cases, provision of immunity and preventive drugs, preparation of resources for Tuberculosis services and control, provision of service facilities and infrastructure in accordance with regulations, and Tuberculosis risk factor control services are all components of tuberculosis control programmes in hospitals.
2	Roles and challenges of nurses in tuberculosis care in Africa: A narrative review (Baruch Baluku et al., 2023)	Africa	Literature review	The hospital programme in Africa plays a crucial role in Tuberculosis care by implementing preventive measures through health promotion, diagnosis, beginning of treatment, monitoring of treatment progress, and evaluation and documenting of treatment outcomes.
3	Preventive Treatment for Household Contacts of Drug-Susceptible Tuberculosis Patients (Salazar-Austin et al., 2022)	America	Mixed-methods qualitative and quantitative	The results showed that the priority strategies for Tuberculosis prevention and control are identification and completion of treatment for people with active Tuberculosis disease; surveillance to find and screen people who have been in contact with Tuberculosis patients; and screening, testing, and treatment of people and other specific populations at high risk for latent Tuberculosis infection and subsequent active Tuberculosis disease.
4	Mycobacterium tuberculosis nucleic acid amplification tests reduce nosocomial tuberculosis exposure in intensive care units: A nationwide cohort study (Wang et al., 2015)	Taiwan	Cohort Study	The quality of hospital services can have a significant impact on the management and control of tuberculosis. Tuberculosis control services, including early detection, appropriate treatment, and effective infection control measures, are essential in controlling the spread of tuberculosis.

Number	Title, Author and Year	Country	Research Type	Result
5	The importance of adherence in tuberculosis treatment clinical trials and its relevance in explanatory and pragmatic trials (Vernon A et al., 2019)	Armenia	Mixed-methods qualitative and quantitative	Patient and family education on Tuberculosis plays an important role in the management and treatment of Tuberculosis to improve adherence to treatment. Tuberculosis education includes information about the disease, its transmission, symptoms, treatment, and the importance of adhering to the prescribed treatment regimen.

Table 1. shows the identification results that factors influencing the success of the national Tuberculosis Program in Hospitals based on Hospital Accreditation Standards (SNARS) are health promotion, early detection of Tuberculosis or health screening, Tuberculosis surveillance, risk factor control; surveillance of Tuberculosis case finding and handling, provision of immunity with vaccines and provision of Tuberculosis preventive drugs.

DISCUSSION

The National Tuberculosis Morbidity Reduction Program based on the National Hospital Accreditation Standards (SNARS) consists of 6 programs: 1) Health promotion; 2) Tuberculosis surveillance; 3) Risk factor control; 4) Tuberculosis case finding and treatment; 5) Immunization; and 6) Preventive drug administration (Hospital Accreditation Committee, 2017). The successful implementation of the TB program at the national level is influenced by the following factors:

Health Promotion Factors

Health promotion aims to enhance accurate and comprehensive understanding of preventive measures, treatment options, hygienic practices, and healthy lifestyles. This, in turn, leads to modifications in the attitudes and behaviours of various stakeholders, including patients, their families, visitors, and hospital personnel. Health promotion endeavours aim to enhance accurate and comprehensive understanding of the prevention of tuberculosis transmission, treatment options, and the adoption of hygienic and healthy lifestyles. These efforts seek to foster alterations in the attitudes and behaviours of patients, their families, hospital visitors, and staff members. Education in the waiting room can be facilitated by the use of audiovisuals, brochures, posters, banners, or videos displayed on television (Hospital Accreditation Committee, 2017).

Tuberculosis (TB) prevention encompasses a range of strategies, including health promotion initiatives, TB monitoring, risk factor management, TB case identification and treatment, immune response enhancement, and the administration of preventive medications.

The assessment of health promotion primarily centres on the provision of tuberculosis (TB)-related education and educational resources. The objective of this strategy is to safeguard public health, diminish rates of TB morbidity, disability, and mortality, halt the spread of the disease, prevent the development of drug resistance, and mitigate the adverse effects of TB (Oktamianti et al., 2021).

Health promotion approaches may also include digital health education that can improve patient self-efficacy in preventing transmission and adhering to TB treatment (Munawaroh et al., 2022). In addition, research shows that prevention of tuberculosis disease through preventive therapy is a major focus in the tuberculosis epidemic control strategy (Rangaka et al., 2015). Thus, health promotion has a significant role in controlling tuberculosis cases through various factors, including health education, cooperation between the public and private health sectors, implementation of social protection policies, preventive therapy, prevention of infection in the workplace, and active case finding in the community.

Tuberculosis Surveillance Factors

Tuberculosis surveillance is the activity of obtaining epidemiological data needed in the information system of the tuberculosis control program, such as recording and reporting drug-sensitive tuberculosis, recording and reporting drug-resistant tuberculosis (Hospital Accreditation Committee, 2017).

Based on research Truzyan et al., (2020), TB surveillance is one of the most important factors in TB case control. Surveillance involves the routine monitoring and reporting of confirmed TB cases in a population. The aim is to identify trends and patterns of disease spread, as well as to evaluate the effectiveness of public health interventions. TB surveillance can assist in the early detection of TB cases, which is important for timely treatment and prevention of further transmission. With effective surveillance, TB cases can be identified before they have the opportunity to transmit the disease to others. In addition, surveillance can also help in the identification of high-risk groups for TB, such as people with HIV, people living or working in prison facilities, and people living in communities with high TB prevalence.

Tuberculosis surveillance factors play an important role in controlling tuberculosis cases through various aspects. One of them is epidemiologic monitoring that allows the identification of new cases and the spread of the disease, thus enabling timely intervention (Churchyard et al., 2017). In addition, surveillance also plays a role in supporting research on drug resistance patterns and tuberculosis dynamics, which can help in the development of more effective treatment strategies (Zhou et al., 2022). Surveillance also allows the identification of risk factors associated with tuberculosis transmission, such as work environment,

socioeconomic status, and smoking habits. By understanding these risk factors, more targeted preventive measures can be implemented to control disease transmission.

Risk Factor Control Factor

Control of tuberculosis risk factors, aimed at preventing, reducing the transmission and incidence of tuberculosis disease, which is implemented in accordance with the guidelines for controlling the prevention of tuberculosis infection in hospitals Control of tuberculosis risk factors, aimed at preventing, reducing the transmission and incidence of tuberculosis disease, which is implemented in accordance with the guidelines for controlling the prevention of tuberculosis infection in hospitals (Hospital Accreditation Committee, 2017).

Research results Oktamianti et al., (2021), states that control of risk factors is an important component of the TB control strategy. HIV, malnutrition, diabetes, smoking, and alcohol misuse are all risk factors for tuberculosis (TB). Managing these risk factors can effectively mitigate the transmission of tuberculosis (TB) and alleviate the overall impact of the disease. Individuals with HIV are significantly more susceptible to getting tuberculosis in comparison to those who are not HIV-infected. Similarly, malnutrition and diabetes can weaken the immune system and make a person more susceptible to TB. Therefore, controlling diabetes and improving nutritional status can help prevent TB. In addition, smoking and alcohol abuse can damage the lungs and increase the risk of TB. Therefore, efforts to reduce smoking and alcohol abuse can also help in TB control. Finally, controlling environmental risk factors, such as crowding and poor ventilation, is also important.

Other studies have shown that risk factors such as obesity and diabetes are correlated with an increased risk of tuberculosis (Lin et al., 2018). Thus, lowering risk factors like diabetes and obesity can aid in the decline in tuberculosis occurrences. The report also emphasizes the significance of tuberculosis preventive therapy as the focal point of a reinvigorated international effort to carry out an all-encompassing epidemic control plan (Rangaka et al., 2015).

This suggests that controlling risk factors through TB preventive therapy may play a role in reducing new TB cases. In addition, statistical analysis shows that social protection and poverty elimination can potentially reduce the burden of tuberculosis at the individual level (Carter et al., 2018).

Thus, controlling risk factors through poverty reduction and social protection efforts can also contribute to controlling TB cases. However, there are also specific risk factors that need to be considered, especially in the pediatric population. Children are susceptible to tuberculosis, and there are certain specificities regarding the development, prevention,

diagnosis, and treatment of tuberculosis in pediatric patients (Carvalho et al., 2018). Therefore, controlling risk factors for tuberculosis through the management of obesity, diabetes, preventive therapy, social protection, and special attention to the pediatric population can play an important role in controlling tuberculosis cases.

Tuberculosis Case Finding and Treatment Factor

Tuberculosis case finding is conducted through patients who come to the hospital, after examination, diagnosis, clarification and determination of the type of tuberculosis patient. Meanwhile, case management is carried out in accordance with the procedures in the national guidelines for tuberculosis medical services and other standards in accordance with the laws and regulations (Hospital Accreditation Committee, 2017).

Research results Gumma et al., (2019), states that TB case finding and treatment are critical factors in TB control. TB case finding involves identifying individuals who show symptoms of TB and conducting appropriate diagnostic tests to confirm the diagnosis. This is important because early detection and treatment of TB can prevent the spread of the disease to others. Once a TB case is found, proper treatment is essential. This involves treatment with anti-TB drugs for a prescribed period of time, usually 6 to 9 months. This treatment must be followed closely to ensure that all TB bacteria have been killed and to prevent the development of drug-resistant TB. In addition, managing TB cases also involves educating patients about their disease, the importance of adherence to treatment, and how to prevent the spread of TB to others. This may involve counseling, health education, and psychosocial support.

This approach, known as the DOTS (Directly Observed Treatment, Short-course) strategy, has proven effective in controlling TB in many countries (Oktamianti et al., 2021). During a progressive scale-up, DOTS has been Indonesia's national TB mitigation plan since 1995. Hospital implementation of DOTS initiatives began in 1999. In 2009, just thirty percent of institutions that had adopted the DOTS strategy provided data on newly reported cases of tuberculosis.

Tuberculosis case finding can be done through various efforts, such as community education on TB prevention and treatment (Atzmardina, 2021). Strategy implementation Directly Observed Treatment Short-Course (DOTS) (Kumalasari et al., 2021). As well as increasing community knowledge about TB (Oktaviani et al., 2023).

In addition, the management of tuberculosis cases also involves clinical aspects, such as effective cough technique interventions for holistic management of pulmonary TB patients and health coaching interventions. (Dewi et al., 2022; Supriatun et al., 2021; Sikesa et al.,

2021). Bacille Calmette Guerin (BCG) immunization is also an important preventive measure, especially in children (Yobeanto et al., 2022).

However, there are also challenges in handling tuberculosis cases, such as the increase in drug resistance cases that make it difficult to treat TB disease (Hidayat et al., 2017). Delay in seeking treatment and expansion of social determinants to reduce the incidence of tuberculosis. Thus, TB case finding and treatment through community education, implementation of the DOTS strategy, clinical intervention, isoniazid prophylaxis, BCG immunization, and expansion of social determinants have an important role in controlling TB cases.

Immunity Providing Factors

The provision of immunity is carried out through the provision of BCG immunization to infants in an effort to reduce the risk of tuberculosis understanding level in accordance with statutory regulations (Hospital Accreditation Committee, 2017). Based on research Oktamianti et al., (2021), Immunization is one of the most effective ways to prevent the spread of TB. The BCG (Bacillus Calmette-Guérin) vaccine is the most commonly used vaccine to prevent TB. It is usually given to infants and children in countries with high TB rates and can prevent severe forms of TB in children. However, the effectiveness of the BCG vaccine in preventing TB in adults varies and research is underway to develop more effective TB vaccines. In addition, providing immunity also involves prophylactic treatment of latent TB. People who are infected with TB but do not show symptoms (latent TB) can be given treatment to prevent the disease from progressing to active TB. Thus, the provision of immunity through vaccination and prophylactic treatment is an important component of the TB control strategy.

Immunologic factors play an important role in controlling tuberculosis cases. Immune conferral can involve various immunologic mechanisms that contribute to resistance to tuberculosis infection (Simmons et al., 2018). In addition, the administration of immunity may also affect the immune response to tuberculosis infection, which may affect treatment outcomes and the spread of the disease (Lange et al., 2020).

Studies also suggest that immune provision may contribute to the prevention of tuberculosis infection, by engaging immune mechanisms that protect the body from infection (Lin et al., 2018). In addition, immune administration may also affect T cell responses and adaptive immunity to *Mycobacterium tuberculosis* in humans (Sia et al., 2019). However, there are also challenges in providing immunity related to tuberculosis, such as the complexity of the interaction between the immune system and *M. tuberculosis*. Thus, immunotherapies

play an important role in controlling tuberculosis cases through immunologic mechanisms involving T cell responses, adaptive immunity, and infection prevention.

Preventive Medicine Administration Factor

Provision of preventive drugs for 6 (six) months aimed at children under 5 (five) years of age who are in close contact with active tuberculosis patients; people with HIV and AIDS (PLWHA) who are not diagnosed with tuberculosis; certain other populations in accordance with statutory regulations (Hospital Accreditation Committee, 2017). Based on research Oktamianti et al., (2021), Preventive drug administration or prophylactic treatment is one of the important strategies in TB control. It involves giving anti-TB drugs to individuals who are at high risk of developing TB, such as those who have been exposed to TB or have conditions that weaken the immune system, such as HIV. This prophylactic treatment aims to prevent the progression of latent TB (asymptomatic TB infection) to active TB (TB with symptoms). By preventing the development of active TB, prophylactic treatment can prevent the spread of TB to others and reduce the burden of disease. Prophylactic treatment usually involves taking anti-TB drugs such as isoniazid or rifampicin for several months. It is important for individuals receiving prophylactic treatment to complete the entire course of treatment to ensure its effectiveness. As such, prophylactic drug administration is an important component of the TB control strategy and can help reduce the burden of disease.

Preventive drug administration plays an important role in controlling tuberculosis cases. Studies have shown that the administration of preventive drugs, such as isoniazid, can be effective in preventing the development of tuberculosis in individuals who are (Marx et al., 2018). In addition, the provision of preventive drugs can also contribute to controlling the spread of the disease, especially in high-risk populations, such as household contacts of tuberculosis patients (Wingfield et al., 2017).

The study also highlighted the importance of preventive drug administration in reducing the disease burden of tuberculosis, especially in populations that have experienced prior treatment. Preventive drug administration may also play a role in accelerating the decline of tuberculosis cases, especially in the context of high epidemics (Marx et al., 2018). However, there are also challenges associated with preventive drug administration, such as patient adherence to treatment, drug side effects, and managing tuberculosis cases in populations with comorbid health conditions, such as HIV/AIDS (Aguillón-Durán et al., 2021). Therefore, a comprehensive and coordinated approach is needed to ensure the success of preventive drug administration in controlling tuberculosis cases. Thus, preventive drug administration has an

important role in controlling tuberculosis cases through preventing disease progression, controlling spread, and accelerating the reduction of tuberculosis cases.

CONCLUSIONS

The standards and assessment elements in hospital accreditation are aligned with national TB control guidelines. These include TB case finding and treatment, provision of immunity through BCG immunization, and administration of preventive drugs. In addition, accreditation also affects the quality of TB laboratories. Accredited laboratories usually have a high standard of TB testing and diagnosis, which is important in TB case control.

Suggestions for the government, hospitals, and communities in an effort to improve the success of the tuberculosis program are that the government can also pay attention to the implementation of the DOTS (Directly Observed Treatment Short-Course) program in hospitals to ensure its optimal implementation; Hospitals can increase knowledge about tuberculosis among pharmacy personnel in primary health centers; Evaluation of the implementation of the National Tuberculosis Control Program norms in tertiary level health facilities can also help hospitals in improving the quality of services; Communities can play an active role in the management and control of tuberculosis in the community; and increased public awareness on the importance of tuberculosis prevention, including through the use of the pentahelix model in tuberculosis eradication, can also make a positive contribution.

REFERENCE

- Aguillón-Durán, G. P., Prieto-Martínez, E., Ayala, D., García, J., Thomas, J. M., García, J. I., Henry, B. M., Torrelles, J. B., Turner, J., Ledezma-Campos, E., & Restrepo, B. I. (2021). COVID-19 and chronic diabetes: the perfect storm for reactivation tuberculosis?: a case series. *Journal of Medical Case Reports*, 15(1), 1–5. <https://doi.org/10.1186/s13256-021-03193-7>
- Albert, H., De Dieu Iragena, J., Kao, K., Erni, D., Mekonen, T., & Onyebujoh, P. C. (2017). Implementation of quality management systems and progress towards accreditation of National Tuberculosis Reference Laboratories in Africa. *African Journal of Laboratory Medicine*, 6(2), 1–8. <https://doi.org/10.4102/ajlm.v6i2.490>
- Alkhenizan, A., & Shaw, C. (2011). Impact of Accreditation on the Quality of Healthcare Services: a Systematic Review of the Literature. *Annals of Saudi Medicine*, 31(4), 407–416. <https://doi.org/10.4103/0256-4947.83204>
- Atzmardina, Z. (2021). Peningkatan Pengetahuan Masyarakat Cikupa Terhadap Tuberkulosis. *Journal of Sustainable Community Development (JSCD)*, 3(3), 178–184. <https://doi.org/10.32924/jscd.v3i3.61>
- Baruch Baluku, J., Katusabe, S., Mutesi, C., & Bongomin, F. (2023). Roles and challenges of nurses in tuberculosis care in Africa: A narrative review. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 31(April), 100366. <https://doi.org/10.1016/j.jctube.2023.100366>
- Carter, D. J., Glaziou, P., Lönnroth, K., Siroka, A., Floyd, K., Weil, D., Raviglione, M.,

- Houben, R. M. G. J., & Boccia, D. (2018). The impact of social protection and poverty elimination on global tuberculosis incidence: a statistical modelling analysis of Sustainable Development Goal 1. *The Lancet Global Health*, 6(5), e514–e522. [https://doi.org/10.1016/S2214-109X\(18\)30195-5](https://doi.org/10.1016/S2214-109X(18)30195-5)
- Carvalho, A. C. C., Cardoso, C. A. A., Martire, T. M., Migliori, G. B., & Sant'Anna, C. C. (2018). Epidemiological aspects, clinical manifestations, and prevention of pediatric tuberculosis from the perspective of the End TB strategy. *Jornal Brasileiro de Pneumologia*, 44(2), 134–144. <https://doi.org/10.1590/s1806-37562017000000461>
- Churchyard, G., Kim, P., Shah, N. S., Rustomjee, R., Gandhi, N., Mathema, B., Dowdy, D., Kasmar, A., & Cardenas, V. (2017). What We Know about Tuberculosis Transmission: An Overview. *Journal of Infectious Diseases*, 216(Suppl 6), S629–S635. <https://doi.org/10.1093/infdis/jix362>
- Dewi, N. T., Selvia, D., & Nusadewiarti, A. (2022). Penatalaksanaan Holistik Pasien TB Paru Melalui Pendekatan Dokter Keluarga di Puskesmas Campangraya. *Jurnal Kesehatan Saintika Meditory*, 5(2), 13–15. <https://doi.org/10.30633/jsm.v5i2.1537>
- Gumma, V., Bennett, D. L., Nguyen Thi Phong, L., Duong Ngoc, C., Bond, K. B., Nguyen Thi Hoang, Y., Erni, D., Nguyen Van, N., Nguyen Van, H., & Albert, H. (2019). Strengthening Quality of Tuberculosis Laboratories Toward Accreditation in Viet Nam. *American Journal of Clinical Pathology*, 152(6), 808–817. <https://doi.org/10.1093/ajcp/aqz104>
- Heidary, M., Shirani, M., Moradi, M., Goudarzi, M., Pouriran, R., Rezaeian, T., & Khoshnood, S. (2022). Tuberculosis challenges: Resistance, co-infection, diagnosis, and treatment. *European Journal of Microbiology and Immunology*, 12(1), 1–17. <https://doi.org/10.1556/1886.2021.00021>
- Hidayat, D., Setiawati, E. P., & Soeroto, A. Y. (2017). Gambaran Perilaku Pencarian Pengobatan Pasien Tuberkulosis di Kota Bandung. *Jurnal Sistem Kesehatan*, 3(2), 65–72. <https://doi.org/10.24198/jsk.v3i2.15005>
- Hospital Accreditation Committee. (2017). *Standar Nasional Akreditasi RS (SNARS)*. DKI Jakarta : Hospital Accreditation Committee. <https://www.pormiki-dki.org/2016-04-20-03-11-28/daftar-buku-kumpulan-peraturan/84-standar-nasional-akreditasi-rs-snars-ed-1-tahun-2017>
- Kumalasari, F. M., & Prabawati, I. (2021). Implementasi Kebijakan Penanggulangan Tuberculosis Dengan Strategi Directly Observed Treatment Short-Course (Dots) Di Puskesmas Kecamatan Bangsal Kabupaten Mojokerto. *Publika*, 9(2), 201–214. <https://doi.org/10.26740/publika.v9n2.p201-214>
- Lange, C., Aarnoutse, R., Chesov, D., van Crevel, R., Gillespie, S. H., Grobbel, H. P., Kalsdorf, B., Kontsevaya, I., van Laarhoven, A., Nishiguchi, T., Mandalakas, A., Merker, M., Niemann, S., Köhler, N., Heyckendorf, J., Reimann, M., Ruhwald, M., Sanchez-Carballo, P., Schwudke, D., ... DiNardo, A. R. (2020). Perspective for Precision Medicine for Tuberculosis. *Frontiers in Immunology*, 11(October), 566608. <https://doi.org/10.3389/fimmu.2020.566608>
- Lee, B. Y., Chun, Y. J., & Lee, Y. H. (2021). Comparison of major clinical outcomes between accredited and nonaccredited hospitals for inpatient care of acute myocardial infarction. *International Journal of Environmental Research and Public Health*, 18(6), 1–9. <https://doi.org/10.3390/ijerph18063019>
- Lin, H. H., Wu, C. Y., Wang, C. H., Fu, H., Lönnroth, K., Chang, Y. C., & Huang, Y. T. (2018). Association of Obesity, Diabetes, and Risk of Tuberculosis: Two Population-Based Cohorts. *Clinical Infectious Diseases*, 66(5), 699–705. <https://doi.org/10.1093/cid/cix852>
- Marx, F. M., Yaesoubi, R., Menzies, N. A., Salomon, J. A., Bilinski, A., Beyers, N., & Cohen,

- T. (2018). Tuberculosis control interventions targeted to previously treated people in a high-incidence setting: a modelling study. *The Lancet Global Health*, 6(4), e426–e435. [https://doi.org/10.1016/S2214-109X\(18\)30022-6](https://doi.org/10.1016/S2214-109X(18)30022-6)
- Ministry of Health of the Republic of Indonesia. (2019). *Panduan Penerapan Jejaring Layanan Tuberculosis di Fasilitas Kesehatan Pemerintah dan Swasta Berbasis Kabupaten/kota*. Jakarta : Ministry of Health of the Republic of Indonesia. https://tbindonesia.or.id/wp-content/uploads/2020/05/PPM_1.-Isi-PANDUAN-PENERAPAN-DPPM-TB.pdf
- Ministry of Health of the Republic of Indonesia. (2020). *Strategi Nasional Penanggulangan Tuberculosis di Indonesia*. Jakarta : Ministry of Health of the Republic of Indonesia. https://tbindonesia.or.id/wp-content/uploads/2021/06/NSP-TB-2020-2024-Ind_Final_-BAHASA.pdf
- Munawaroh, I., Kurniawati, N. D., Purwaningsih, P., Romantika, D. D., & Karingga, D. D. (2022). Increasing Self Efficacy Behavior Prevention of Transmission and Compliance with Tuberculosis Medication through Health Promotion: A Systematic Review. *Prisma Sains : Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 10(3), 503–509. <https://doi.org/10.33394/j-ps.v10i3.5321>
- Oktamianti, P., Bachtiar, A., Sutoto, S., Trihandini, I., Prasetyo, S., Achadi, A., & Efendi, F. (2021). Tuberculosis control within indonesia’s hospital accreditation. *Journal of Public Health Research*, 10(3), 1979. <https://doi.org/10.4081/jphr.2021.1979>
- Oktaviani, S. D., Sumarni, T., & Supriyanto, T. (2023). Studi Kasus Implementasi Batuk Efektif pada Pasien dengan Tuberculosis Paru. *Jurnal Penelitian Perawat Profesional*, 5(2), 875–880. <https://doi.org/10.37287/jppp.v5i2.1633>
- Rangaka, M. X., Cavalcante, S. C., Marais, B. J., Thim, S., Martinson, N. A., Swaminathan, S., & Chaisson, R. E. (2015). Controlling the Seedbeds of Tuberculosis: Diagnosis and Treatment of Tuberculosis Infection. *Lancet*, 385(10010), 1–20. [https://doi.org/10.1016/S0140-6736\(15\)00323-2](https://doi.org/10.1016/S0140-6736(15)00323-2).Controlling
- Salazar-Austin, N., Mulder, C., Hoddinott, G., Ryckman, T., Hanrahan, C. F., Velen, K., Chimoyi, L., Charalambous, S., & Chihota, V. N. (2022). Preventive Treatment for Household Contacts of Drug-Susceptible Tuberculosis Patients. *Pathogens*, 11(11), 1–13. <https://doi.org/10.3390/pathogens11111258>
- Sia, J. K., & Rengarajan, J. (2019). Immunology of Mycobacterium tuberculosis Infections. *Microbiology Spectrum*, 7(4), 3–22. <https://doi.org/10.1128/microbiolspec.gpp3-0022-2018>
- Sikesa, I. G. P. H., & Somia, I. K. A. (2021). Profilaksis isoniazid merupakan faktor protektif kejadian tuberkulosis pasien HIV/AIDS di klinik VCT RSUP Sanglah Denpasar. *Jurnal Penyakit Dalam Udayana*, 5(2), 51–55. <https://doi.org/10.36216/jpd.v5i2.61>
- Simmons, J. D., Stein, C. M., Seshadri, C., Campo, M., Alter, G., Fortune, S., Schurr, E., Wallis, R. S., Churchyard, G., Mayanja-Kizza, H., Boom, W. H., & Hawn, T. R. (2018). Immunological mechanisms of human resistance to persistent Mycobacterium tuberculosis infection. *Nature Reviews Immunology*, 18(9), 575–589. <https://doi.org/10.1038/s41577-018-0025-3>
- Supriatun, E., & Insani, U. (2021). Intervensi Health Coaching Dalam Meningkatkan Pengetahuan dan Sikap Pencegahan Penularan Tuberculosis. *Jurnal Keperawatan Silampari*, 4(2), 383–396. <https://doi.org/10.31539/jks.v4i2.1942>
- Truzyan, N., Grigoryan, Z., Musheghyan, L., Crape, B., & Petrosyan, V. (2020). Quality of Inpatient Tuberculosis Health Care in High-Burden Resource-Limited Settings: Protocol for a Comprehensive Mixed Methods Assessment Study. *JMIR Research Protocols*, 9(1), 1–7. <https://doi.org/10.2196/13903>
- Vernon A, Fielding K, Savic R, Dodd L, & Nahid P. (2019). The importance of adherence in tuberculosis treatment clinical trials and its relevance in explanatory and pragmatic

- trials. *PLoS Medicine*, 16(12), e1002884. <https://doi.org/10.1371/journal.pmed.1002884>
- Wang, J. Y., Lee, M. C., Chang, J. H., Yu, M. C., Wu, V. C., Huang, K. L., Su, C. P., Chao, K. M., & Lee, C. H. (2015). Mycobacterium tuberculosis nucleic acid amplification tests reduce nosocomial tuberculosis exposure in intensive care units: A nationwide cohort study. *Respirology*, 20(8), 1233–1240. <https://doi.org/10.1111/resp.12612>
- WHO. (2022). *Global Tuberculosis Report*. World Health Organization. <https://www.who.int/publications/i/item/9789240061729>
- Wingfield, T., Tovar, M. A., Huff, D., Boccia, D., Montoya, R., Ramos, E., Datta, S., Saunders, M. J., Lewis, J. J., Gilman, R. H., & Evans, C. A. (2017). Une étude contrôlée randomisée de l'accompagnement socioéconomique pour améliorer la prévention et le traitement de la tuberculose au Pérou. *Bulletin of the World Health Organization*, 95(4), 270–280. <https://doi.org/10.2471/BLT.16.170167>
- Yobeanto, N., & Setiawan, T. L. (2022). Pola Resistensi Kuman Mycobacterium Tuberculosis Terhadap Obat Anti Tuberkulosis Lini Pertama. *Jurnal Health Sains*, 3(5), 654–662. <https://doi.org/10.46799/jhs.v3i5.486>
- Zhou, L., Wu, B., Huang, F., Liu, Z., Wang, F., Zhang, M., Chen, B., Chen, S., Wang, X., & Zhao, Y. (2022). Drug resistance patterns and dynamics of tuberculosis in Zhejiang Province, China: Results from five periodic longitudinal surveys. *Frontiers in Public Health*, 10(1047659), 01–08. <https://doi.org/10.3389/fpubh.2022.1047659>