

The Role of Global Health Partnerships in Infectious Disease Control: Lessons from Indonesia's Response to Tuberculosis and COVID-19

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ABSTRACT

Indonesia's dual burden of tuberculosis and COVID-19 has highlighted the critical role of global health partnerships in strengthening infectious disease control. This study examines how collaborations with organizations such as WHO, the Global Fund, and USAID have supported Indonesia's response, particularly in TB detection, case management, and pandemic adaptation. A qualitative literature review was conducted, analyzing ten peer-reviewed studies published between 2020 and 2025. The findings reveal that while global partnerships facilitated knowledge transfer, financial assistance, and digital innovation, challenges persist in coordination, private sector integration, and policy alignment. The study concludes that sustained commitment, institutional capacity, and harmonized governance are essential to maximize the impact of international cooperation on national disease control strategies.

I. Introduction

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium Tuberculosis*, which can attack the lungs and other organs (Peraturan BPK, 2017). Tuberculosis (TB) is a major global health issue and one of the leading causes of death worldwide (Motta et al., 2024). Tuberculosis (TB) remains a leading infectious disease, causing 1.6 million deaths annually. WHO said, in 2023 an estimated 10.8 million people around the world developed TB, including approximately 6.0 million men, 3.6 million women, and 1.3 million children, and also affects all countries and age groups (WHO, 2025). In 2024, 193 countries and areas with more than 99% of the world's population and TB cases reported data to WHO. Coronavirus disease 2019 (Covid-19) pandemic changed the global health landscape, which had profound implications for the management and diagnosis of other infectious diseases, notably TB (Loutsou et al., 2024). In 2020-2024, Covid-19 has infected and killed millions of people around the world. In January 2024, WHO reported that 774 million confirmed cases and 7 million deaths to Covid-19 (WHO, 2024). In addition to causing millions of deaths worldwide, Covid-19 also demonstrates the profound health risks and impacts that result from infectious disease emergencies. The Covid-19 pandemic has further highlighted gaps in infectious disease preparedness and response. The COVID-19 pandemic has exposed systemic weaknesses in various aspects, such as health infrastructure, government preparedness, human resources, and the overall public health system. Many health facilities are unprepared to handle the surge of patients due to limited training, equipment, and service capacity. On the other hand, the lack of a consistent public narrative and ineffective communication also worsened the situation. Cooperation between governments, health institutions, and timely communication has proven crucial to controlling the spread of infection. However, it is unclear whether the health system has adapted sufficiently to deal with the next outbreak. Therefore, an important part of post-pandemic recovery is to restructure the public



health system to be more prepared, efficient and resilient in the face of new infectious diseases, with a management approach that includes: management, protection, containment, information and support (Filip et al., 2022).

Most cases of TB are found in low-and middle-income countries, such as Indonesia. Indonesia contributes 8.5% of the global Tuberculosis morbidity rate, which is the global morbidity rate of 10 million people. Based on the Global TB Report 2024, Indonesia holds the second-highest tuberculosis burden globally, following India (Kemenkes RI, 2025). During the COVID-19 pandemic, Indonesia reported over 4.2 million confirmed cases and approximately 144,000 deaths by the end of 2021. The peak of daily confirmed cases occurred in mid-July 2021, followed by a surge in deaths at the end of the month. This situation overwhelmed health facilities, caused oxygen shortages, and disrupted essential health services, including tuberculosis programs (Slamet, 2022). Despite existing international collaborations, TB control efforts face persistent challenges in detection, treatment adherence, and drug-resistant TB management. International cooperation, particularly through the WHO's 'End TB Strategy' is critical to ending TB globally. The strategy involves collaboration between countries, international organizations and various stakeholders to improve early detection, treatment, prevention, research related to TB. Indonesia, as one of the countries with the highest TB burden, actively participates in this strategy, including through the 'Gerakan Indonesia Akhiri Tuberkulosis' (GIAT). In addition, the Government of Indonesia has also developed a national strategy to control TB, which is aligned with the WHO's End TB Strategy.

Indonesia is working with global partnerships for TB and COVID-19 such as the Global Fund and USAID. The Global Fund is the main source of international funding for TB, more than 75% in low- and middle-income countries. Since 2017, the Global Fund has supported public and private sector engagement through the Public-Private Mix (PPM) framework for TB case detection. Funds are also channeled through the COVID-19 response mechanism (C19RM) to minimize the impact of the pandemic on TB services and accelerate the response recovery. Globally, by 2022, more than 6.7 million people will have been diagnosed with TB and treated. In 2021 to 2022, the achievement of PPM contribution in the Global Fund grant for TB response did not increase significantly from 18% to 20%. (Yassin et al., 2024). In 2017 Indonesia developed a TB Challenge framework in collaboration with the United States Agency for International Development (USAID) and the National TB Program to improve health services for TB disease. However, due to the impact of COVID-19 funding for the TB response from 2019 to 2020 has decreased by 30%. In response, the partnership focused on identifying the potential impact of COVID-19 on the management of the TB response in Indonesia. In addition, the Global Fund has also made a significant impact on the TB response by providing 207 million USD funding from 2014 to 2020 in Indonesia (Caren et al., 2022)

However, it is unclear how effective the partnership with the Global Fund and USAID has been in tackling TB and the impact of COVID-19 in Indonesia. Regular monitoring and evaluation of TB control activities needs to be carried out. This is important to determine the achievement of targets, obstacles faced, and improvements in the implementation of the TB and COVID-19 control programs. This study aims to analyze the impact of international cooperation in controlling infectious diseases in Indonesia, especially TB and COVID-19 cases. In addition, it identifies the roles and obstacles faced to tackle these infectious diseases.

II. Methods

This study employed a literature review design, conducted through the identification, critical analysis, and synthesis of relevant peer-reviewed articles sourced from PubMed, DOAJ, and Google Scholar databases. The search strategy utilized a combination of keywords, including: *"Global health partnerships" OR "collaboration" AND "infectious disease control" OR "Tuberculosis response" OR "COVID-19 response" AND "Indonesia"*. Articles were screened based on predefined inclusion and exclusion criteria. Inclusion criteria consisted of: (1) articles published between 2020 and 2025, and (2) full-text availability. Exclusion criteria included: (1) articles with topics deemed irrelevant to the scope of the review, and (2) studies with designs that did not align with the research objective. The selected articles were then analyzed following the search flow shown in Figure 1.

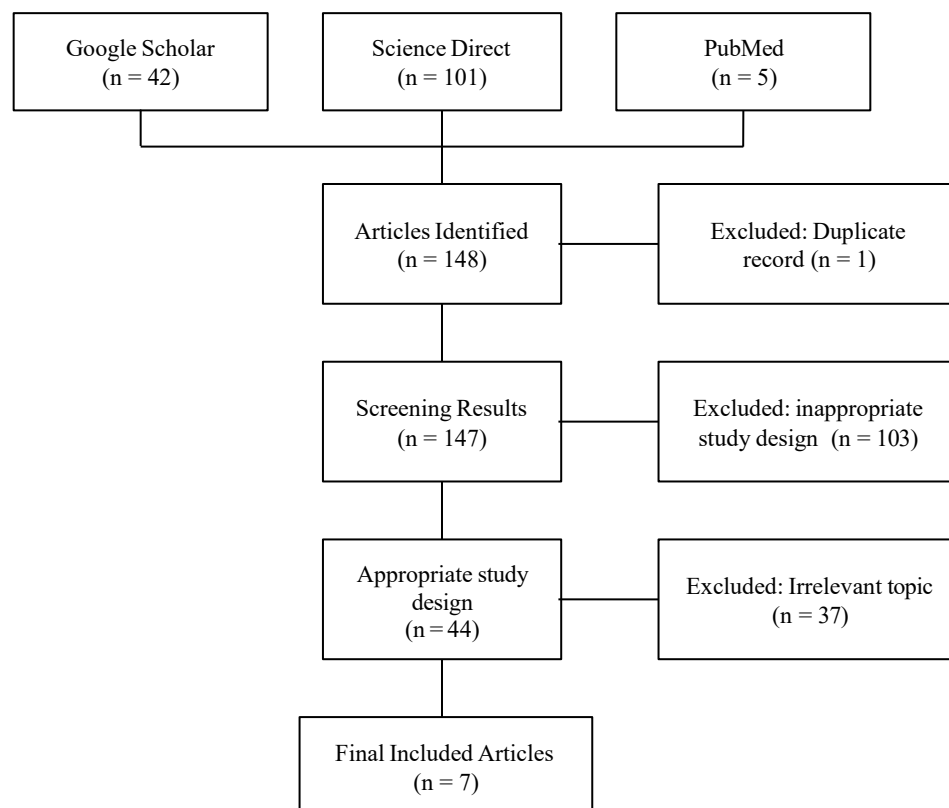


Figure 1. Literature Search Process

III. Results and Discussion

Results

The literature review resulted in ten research journals, as listed in Table 1.

Table 1. Results of literature review

Author(s) & Year	Title	Objective	Method	Key Findings
Asep Setiawan et al. (2022)	Indonesia's Global Health Diplomacy in The Time of Covid-19 Pandemic	To analyze Indonesia's global health diplomacy during COVID-19	Qualitative descriptive (secondary data)	Indonesia used bilateral and multilateral diplomacy to access vaccines and global health support, highlighting its active role in promoting global health governance.

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Author(s) & Year	Title	Objective	Method	Key Findings
Bhatia et al. (2020)	Mitigating the Impact of the COVID-19 Pandemic on Progress Towards Ending Tuberculosis in the WHO South-East Asia Region	To examine the effect of COVID-19 on TB elimination in the SE Asia region	Policy analysis	COVID-19 disrupted TB services across the region; urgent recovery and mitigation actions are needed to sustain progress toward TB elimination.
Subekti et al. (2023)	Cooperation of WHO Member States in Handling COVID-19	To explore cooperation between WHO member states during the pandemic	Descriptive study	The pandemic emphasized the importance of global collaboration, with WHO playing a central role in coordination and technical support.
Widarna R et al. (2024)	Shifting Landscape of Private Healthcare Before and During COVID-19	To examine changes in the role of private providers during the pandemic	Mixed-methods (trend analysis & interviews)	COVID-19 exposed weak coordination with the private sector; private actors are essential for future TB and pandemic preparedness.
Sassi et al. (2024)	Impact of the COVID-19 Pandemic on Quality of Tuberculosis Care in Private Facilities in Bandung, Indonesia	To assess how COVID-19 affected TB care quality in private facilities	Cross-sectional study using standardized patients	Quality of TB services declined during the pandemic; reduced availability and adherence to TB protocols were reported.
Kato (2024)	Development and Challenges of Infectious Disease Control Measures in Trade Policy Using COVID-19-related Medical Resources as a Case Study	To examine trade policy's role in infectious disease control during COVID-19	Policy analysis	The pandemic exposed challenges in global supply chains and IP rights, highlighting the need for equitable trade-related policies for medical supplies.
Yassin et al. (2024)	Leveraging Global Fund's Investments to Expand	To evaluate the impact of Global Fund investments on	Program evaluation	Global Fund resources enabled scalable public-private partnership models that improved

Author(s) & Year	Title	Objective	Method	Key Findings
	Innovative Public-Private Provider Engagement in TB	TB provider engagement		TB case detection and management.
Vasquez et al. (2025)	COVID-19 Policies and Tuberculosis Services in Private Health Sectors of India, Indonesia, and Nigeria	To compare how COVID-19 policies affected TB services in three countries	Comparative policy study	TB services in private sectors were disrupted by COVID-19 policies; stronger integration and quality assurance for private providers are needed.
Fardan Ahmada S (2024)	Indonesia's Interest toward G20 Pandemic Fund: Global Health Diplomacy Perspective	To assess Indonesia's position on the G20 Pandemic Fund	Global health diplomacy analysis	The fund is a strategic tool for Indonesia to secure health financing and expand its diplomatic influence.
Sadewa (2024)	DP Global Health in International Relations: State Actors' Response to COVID-19	To analyze state responses in global health from an international relations perspective	Analytical qualitative study	The pandemic highlighted the central role of states in global health governance and the emergence of new forms of solidarity.

Discussion

Dynamics of Global Health Partnerships in Addressing TB and COVID-19

WHO's role in addressing infectious diseases is realized through the development of a health equity-based policy framework, which serves as a guide for countries in designing more targeted policies. The framework helps strengthen partnerships between the public and private sectors of health service providers, and encourages sustainable private sector investment. In countries with a high burden of TB, including Indonesia, collaboration with the private sector is essential to strengthen access to care, cost efficiency, and quality of care. This is because some people tend to choose non-government health services (Vasquez et al., 2025). WHO aims to treat 18 million people with TB, half a million of whom are drug-resistant TB patients. WHO is working closely with the private sector with the aim of mapping patients suffering from TB and ensuring proper care to this group. In addition, it supports the availability of social support to TB patients who are undergoing treatment (Bhatia et al., 2020).

Through the global policy of the Public-Private Mix (PPM) framework, WHO encourages coordination with cross-sectors, the use of digital-based technology, and continuous program monitoring and evaluation. WHO also encourages political engagement and resource allocation from countries in order to support TB elimination efforts. In addition, the Global Fund serves as the main source of international TB funding, especially in low to middle income countries. The Global Fund is allocating more than 13 billion USD for the management of

infectious diseases such as TB, HIV, malaria and health systems strengthening in the 2024-2026 grant cycle. The funding is used to develop innovative Public-Private Mix (PPM) models to expand access to services and strengthen rapid response to TB. The Global Fund also promotes collaboration between governments and health service providers to create an effective and efficient TB response. The strategy focuses on inviting new partnerships and integrated approaches to achieve elimination targets by 2020 (Yassin et al., 2024).

Indonesia's Health Diplomacy in the Context of the Pandemic

The COVID-19 pandemic is a major problem for international cooperation and an opportunity for Indonesia to strengthen health diplomacy as part of its strategy to address the global crisis. Especially for many developing countries that have to build their health resilience amidst the sluggishness of their economy (health services and medical infrastructure), so that cooperation will be the most rational choice for countries, although prioritizing national interests is an absolute must for every country that enters the Health Diplomacy round and also Indonesia cooperates with three parties, China, South Korea, and the United Arab Emirates, through state or private companies, which is the international cooperation also returns to domestic interests in early 2021 (Subekti et al., 2023). Health diplomacy is an important instrument to promote international cooperation in pandemic prevention, preparedness and response. Sadewa (2024), discusses how Indonesia plays an important role in managing the global health crisis through a health diplomacy approach that combines statist and globalist perspectives. The statist approach emphasizes the importance of strengthening health infrastructure and national policies as a form of protection for state stability, while the globalist approach highlights the importance of international collaboration, equitable vaccine distribution, and global health governance. The integration of these two approaches reflects Indonesia's efforts to balance domestic interests with global solidarity (Sadewa, 2024).

Besides that, the article from Fardan Ahmada (2024), said that the transformation of Indonesia's health diplomacy can be traced from its involvement in Global Health Diplomacy (GHD), which initially focused on state interests, and then developed into an active regional actor. Indonesia has a track record of chairing the Global Fund for AIDS, Tuberculosis and Malaria, and has hosted various international conferences on health financing. Indonesia, in its diplomacy, emphasizes the importance of international collaboration and access of all countries to obtain vaccines (Wangke, 2021). Setiawan, *et al* (2022), said that Indonesia conducted global health diplomacy through multilateral channels to maintain global health governance and promote international efforts in dealing with the Covid-19 pandemic and also uses global health diplomacy through multilateral and bilateral channels to gain access to vaccine provision. Besides that, Indonesia's global health diplomacy was conducted to obtain assistance in dealing with non-health problems, namely economic and social issues (Ahmada, 2024; Asep Setiawan, 2022).

Adaptations and Innovations Facilitated by Partnerships

The dual crisis of Tuberculosis (TB) and COVID-19 necessitated significant adaptations and innovations within Indonesia's health system, a process greatly accelerated by global health partnerships. The profound disruption to essential health services, evidenced by a sharp decline in TB case notifications and treatment coverage nationwide (Oxford University Clinical

Research Unit, 2023) created an urgent need for new strategies. One study highlighted a significant drop in TB case detection during the pandemic, underscoring the challenge that partnerships sought to address (Utomo et al., 2025). In response, these collaborations became instrumental in fostering and scaling novel approaches to maintain and improve infectious disease control.

A primary area of innovation was the enhancement of digital health infrastructure. Faced with lockdowns and strained healthcare access, partnerships facilitated the deployment of digital platforms for TB screening, monitoring, and reporting, while also promoting community-based education and expanding engagement with private providers to maintain service continuity (Eriansyah et al., 2025). This digital transformation was complemented by cutting-edge technological advancements supported by organizations like the Global Fund, which included piloting AI solutions for screening, using targeted genomics for drug-resistant TB detection, and deploying portable technologies like handheld X-ray machines (The Global Fund, 2023).

Furthermore, these partnerships spurred the development of more resilient service delivery models. The Global Fund's investments were pivotal in scaling Public-Private Mix (PPM) models, which were critical for bridging gaps in the national TB program by formally engaging the private healthcare sector, a primary point of care for a large portion of the population. The COVID-19 Response Mechanism (C19RM) is a key example of an adaptive financial strategy, allowing flexible use of funds to ensure TB service continuity while simultaneously tackling the immediate challenges of the COVID-19 pandemic.

At a macro level, these operational adaptations were underpinned by Indonesia's strategic use of health diplomacy. The government actively engaged in multilateral and bilateral channels to navigate the pandemic, secure necessary resources like vaccines, and maintain global health governance (Setiawan et al., 2022). This diplomatic engagement was crucial for creating a supportive ecosystem for international cooperation, allowing Indonesia to leverage partnerships not just for funding, but for accessing and implementing critical health innovations (Sari et al., 2024).

The Impact of the COVID-19 Pandemic on TB Services in Indonesia

COVID-19 pandemic presents a huge cover on health systems globally, and it also causes significant impact to tuberculosis (TB) treatment in Indonesia. Studies have emphasised the complicated impacts of the pandemic on TB services, particularly in the private sector.

Indonesia's medical ecosystem, in which private healthcare plays a crucial role, has been profoundly disrupted. These interruptions included lack of availability of health services, reduced TB care-seeking behavior, and challenges in the delivery of quality TB services. Vasquez et al. (2025) emphasised that TB care in the private health care sectors in India, Indonesia, and Nigeria has been disturbed by COVID-19 control measures and policies. These disruptions were associated with resource redeployment for covid-19 response, decline in T.B. case detection, disruption of diagnostic services, and reduced accuracy of T.B. diagnosis. Sassi et al. (2024) also found that TB notifications in Indonesia have 1:20 decreased due to the pandemic. This was due to several factors including restricted health services access, reduced seeking of TB care, and potential confusion between the diagnosis of TB and COVID-19 (Sassi et al., 2024; Vasquez et al., 2025).

Private sector is a significantly source of outpatient health care use and first visit to seek

medical attention for TB treatment in Indonesia, where in the past the private sector was barely interacting with the NTP. These challenges were only exacerbated by the pandemic. Widarna et al. (2024) reported about a reduction in the number of operating private healthcare facilities during the pandemic. However, there was an increase in laboratory, X-ray, and pharmacy. In particular, the number of private practitioners, who saw a patients with TB disease, increased (Widarna et al., 2024).

Several studies highlighted the imperative need to strengthen the PPP relationships in order to sustain seamless continuum of TB care and to improve the quality of TB services. Vasquez et al. (2025) stimulus of PPP within the provision of health services and investment from private sector that is continuous (Vasquez et al., 2025).

Gaps and Challenges in Implementing Global Health Partnerships

The implementation of global health partnerships, especially during the COVID-19 pandemic, shows major gaps and challenges. A study by Vasquez et al. (2025) showed that tuberculosis (TB) services in the private health sector in India, Indonesia, and Nigeria were disrupted due to uncoordinated COVID-19 policies or imbalances with private providers that led to weak service effectiveness. Similarly, Bhatia et al. (2020) found that the pandemic hindered the progress of tuberculosis (TB) treatment programs in Southeast Asia as donor funding and attention previously allocated to TB shifted to COVID-19 treatment. This has the potential to worsen the epidemiological situation of TB. Therefore, there is a need to emphasize better integration between TB programs and pandemic response efforts (Bhatia et al., 2020; Vasquez et al., 2025)

In addition, a study by Kato (2024) underlined that the COVID-19 pandemic exposed the fragility of countries that are overly dependent on external medical supplies, mainly due to limited intellectual property rights and unfair global trade policies. It is this kind of dependence that creates long-term unsustainability as countries do not build sufficient domestic capacity. Kato (2024) also explains that global trade and health policies are not sufficiently integrated, so the global supply chain is disrupted, and many countries experience shortages of medical devices. In addition, the private sector often does not have equal access to national quality assurance and logistics systems, creating service gaps (Vasquez et al., 2025). This calls for better cross-sector and cross-country coordination, more resilient funding models, and fairer trade frameworks for global health partnerships to effectively support countries in sustaining essential health services in times of crisis (KATO, 2024; Vasquez et al., 2025).

Impacts of Global Health Partnerships on TB and COVID-19 Outcomes

Global health partnerships have played a pivotal role in strengthening Indonesia's response to tuberculosis (TB) and COVID-19. One of the most tangible impacts has been the enhancement of TB case detection, particularly through the implementation of Public-Private Mix (PPM) models supported by the Global Fund and WHO. These models expanded the engagement of private healthcare providers in TB diagnosis and reporting, supported by investments in digital health infrastructure (Yassin et al., 2024). Although the increase in detection between 2021 and 2022 was modest, these initiatives contributed significantly to building sustainable surveillance systems.

In addressing multidrug-resistant TB (MDR-TB), international partnerships have indirectly reduced the risk of resistance by promoting standardized treatment adherence frameworks. WHO-led initiatives reinforced the adoption of national treatment protocols and

supported patient monitoring mechanisms, while Global Fund investments helped ensure the availability of second-line drugs (Bhatia et al., 2020). Although data directly linking global cooperation to a reduction in resistance remain limited, improved access to care and treatment continuity are critical mitigating factors.

During the COVID-19 pandemic, these partnerships helped cushion the disruption of TB services. Despite widespread interruptions, global assistance facilitated the maintenance of pharmaceutical supply chains and bolstered the use of remote patient monitoring technologies (Sassi et al., 2024; Widarna et al., 2024). This was especially vital in Indonesia's fragmented health system, where the private sector provides a substantial share of outpatient TB services. Moreover, global initiatives that promoted integrated public-private health responses contributed to strengthening long-term system resilience (Vasquez et al., 2025).

Beyond clinical impacts, global health partnerships contributed to capacity building, regulatory harmonization, and elevated Indonesia's role in global health diplomacy. The sustained knowledge transfer, financial assistance, and strategic alignment provided by entities such as WHO, USAID, and the Global Fund enabled Indonesia to better navigate the dual burden of TB and COVID-19. However, gaps in policy integration, coordination across sectors, and financial sustainability persist, signaling the need for more cohesive and adaptive cooperation models.

Strategic Lessons from Indonesia's Response to the Pandemic and TB

One of the most valuable lessons is the effectiveness of coordinated global partnerships in mobilizing resources and expertise. As demonstrated in studies by Yassin et al. (2024) and Bhatia et al. (2020), partnerships with organizations such as the Global Fund and WHO enabled Indonesia to maintain critical TB control programs and access life-saving COVID-19 interventions. These partnerships facilitated not only financial aid but also supported the transfer of technical knowledge, the scaling of surveillance systems, and the deployment of digital tools and public-private engagement models. This underscores the need to move beyond donor-recipient relationships toward more dynamic, integrated collaborations that build capacity and foster innovation (Bhatia et al., 2020; Yassin et al., 2024).

The second lesson revolves around the fragility of health service delivery, particularly in the face of systemic shocks. As highlighted by Sassi et al. (2024), Vasquez et al. (2025), and Widarna et al. (2024), disruptions to TB care during COVID-19, especially within the private sector, illustrate the consequences of under-resourced and poorly coordinated systems. Strengthening national health systems to be more adaptive, interoperable, and inclusive of private providers is thus essential. It also reinforces the value of investing in health infrastructure before crises occur, so that emergency responses can be built on stable platforms (Sassi et al., 2024; Vasquez et al., 2025; Widarna et al., 2024).

Third, Indonesia's active diplomatic engagements during the pandemic offer valuable insights into the role of state leadership and foreign policy in health crises. As Setiawan (2022), Ahmada (2024), and Subekti et al. (2023) illustrate, Indonesia was proactive in leveraging multilateral platforms such as WHO and the G20 to secure vaccine access and pandemic-related

support. These diplomatic efforts not only enhanced Indonesia's global standing but also served as a vital mechanism to ensure equitable distribution of resources (Ahmada, 2024; Asep Setiawan, 2022; Subekti et al., 2023).

However, coordination challenges and dependencies also revealed areas for improvement. The fragmented implementation of health initiatives and trade-policy barriers to medical supply distribution point to the importance of institutional preparedness, regulatory alignment, and strong governance (KATO, 2024; Vasquez et al., 2025).

Although the functions of global partnerships have been delineated, it is crucial to explicitly define their quantifiable effects, specifically regarding improvements in case detection, reductions in medication resistance, or other tangible contributions. In Indonesia, global partnerships have significantly improved TB case detection, especially through the Public-Private Mix (PPM) model, which expanded the involvement of private providers in case reporting and diagnosis (Yassin et al., 2024). These partnerships facilitated the prevention of treatment interruptions and the mitigation of medication resistance during the COVID-19 pandemic by sustaining pharmaceutical supply chains and promoting treatment adherence (Bhatia et al., 2020).

Despite the pandemic resulting in service delays and heightened opposition, particularly within the private sector, digital technologies and data systems bolstered by global entities, facilitated the maintenance of patient monitoring and early detection initiatives (Sassi et al., 2024; Widarna et al., 2024). Furthermore, integrated public-private service frameworks have strengthened the community-level response and long-term health system resilience (Vasquez et al., 2025).

IV. Conclusion

Indonesia's experience with TB and COVID-19 demonstrates the importance of global health partnerships in supporting national health responses. External support from WHO and the Global Fund contributed to continuity of care, digital innovation, and public-private engagement. However, challenges in coordination, governance, and equitable access indicate that partnerships must be integrated into a more resilient and inclusive health system.

To improve future responses, Indonesia should institutionalize international cooperation within its national health framework, strengthen intersectoral coordination mechanisms, and invest in adaptive infrastructure. Embedding health diplomacy into long-term foreign policy will be key to sustaining collaboration and securing equitable global support beyond emergency periods.

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