

The Impact of COVID-19 on the Diagnosis and Treatment of Tuberculosis in the Philippines in a Health Care Provision and Population-Centric Context

Reine Christian Adriel Bautista Lantin

ABSTRACT

The COVID-19 pandemic has had far-reaching consequences on the diagnosis and treatment of tuberculosis (TB). This project focuses on these issues in the context of the Philippines, which has the world's fourth-largest incidence of TB. In the early stages of the pandemic, notifications of new TB cases in the Philippines drastically decreased, resulting in uncertainty over the true burden of new cases. The Philippines was one of the first nations to create a TB adaptation plan to cope with the challenges of the pandemic. Treatment adaptations included shifting to home-based care and increasing the amount of medicine prescribed between appointments to last weeks rather than days. Despite the challenges the pandemic posed, these treatment adaptations have led to improvements in the continuity of TB care in the Philippines in comparison to before the pandemic. Co-infection with COVID-19 and TB was a major public health concern, given the increased risk of complications amid hospital resource constraints. In summary, this project will review and discuss how lessons learned during the COVID-19 pandemic in the Philippines have shaped the current TB care continuum from diagnosis to treatment.

INTRODUCTION

Tuberculosis has an extensive history in the Philippines. The country ranks fourth worldwide in tuberculosis incidence with about one million Filipinos having active tuberculosis (Flores et. al., 2022). As the disease is a massive problem in the country, efforts have been made to effectively locate and treat any patients with the disease. However, these improvements were greatly halted and regressed during the height of the COVID-19 pandemic. The Philippines was hit hard, having more than 4 million confirmed cases and more than 66 thousand confirmed deaths since the start of the pandemic, according to the WHO.

Comorbidity, defined as “the simultaneous presence of two or more diseases or medical conditions in a patient,” COVID-19 and TB was also a major concern. Further, the co-occurrence of these two epidemics can affect more than individual patients when considering population health and the provision of healthcare services. This paper aims to analyze the impact of the COVID-19 pandemic on the treatment of TB in a population and healthcare-centric context, to examine the *positive and negative impacts* of the adaptations made in TB treatment during the COVID-19 pandemic.

BACKGROUND

TUBERCULOSIS IN THE PHILIPPINES

In the Philippines, 16.7% of the population is below the poverty line (CIA, 2018), and many more face the dangers of poverty. Unsanitary and overcrowded habitats, lack of education, and lack of means to access proper healthcare all help proliferate Tuberculosis in the country. The Philippines is “one of the 8 countries that account for two-thirds of the estimated global cases”, and is “the fourth largest contributor of TB cases at 7 percent of the global total.” (Philippine

News Agency, 2023). In the country, an estimated 1 million Filipinos are afflicted with TB, with about 70 Filipinos dying from it. Regionally, most of the notified cases are located in the more populated regions of Luzon, with NCR (National Capital Region), Region IV-A, and Region III counting for most cases in the country, with about 16%, 16%, and 11%, respectively.

TB treatment plans and programs such as the National Tuberculosis Care Program (NTP) have been created to control TB incidence rates and to treat TB patients effectively. However, due to the socio-economic state of the country, challenges with TB control have persisted. According to the WHO global tuberculosis report, the Philippines had a constant incidence rate in the WHO global tuberculosis report while having an increasing rate of new and relapsing cases over the years, which suggests that the situation is getting worse. Insufficient resources, lack of access to healthcare, lack of political support, and limited knowledge about specific TB treatment plans by healthcare providers contribute to the ongoing burden of TB in the Philippines. Furthermore, patients face particular issues that limit their access to TB treatment, such as a lack of funds to afford treatment, lack of transportation to reach these treatments, location of individual homes, adverse reactions to specific research, and even a fear of stigmatization from others. With the arrival of the COVID-19 pandemic, these issues affecting TB health care were made significantly more acute.

THE IMPACT OF COVID ON TB IN THE PHILIPPINES

Being near China, COVID-19 quickly got into the Philippines' borders and ended up affecting the country drastically. At its peak in January 2022, there were about 240,000 confirmed cases at once, and at this point in time, there have been about 4 million confirmed cases and 66,661 deaths. With sudden and drastic spikes in cases throughout the pandemic, most services had to be shut down and put on hold due to the virus. With the addition of the TB issue in the Philippines, more issues surfaced.

In response to the initial outbreak, the government response included the lockdown of homes, closure of non-essential services, such as businesses and schools, travel restrictions, and the reassigning of healthcare workers to COVID-19 duties. Standard COVID-19 precautions were also instated, such as the use of masks and face shields and the requirement for personal protective equipment (PPEs) for healthcare workers. Although these responses were done in good faith and were effective in containing the spread of COVID-19, they became the catalyst of many issues faced by healthcare workers during the early stages of the pandemic.

As the pandemic continued, more issues started to arise regarding the experiences of specific populations. The Philippines contains very diverse sets of people with different backgrounds, social standings, and privileges, which can drastically affect their lives and population health, especially during a pandemic. These factors pose issues in providing healthcare services to these people, so considering and analyzing them is important.

NTP ADAPTIVE PLAN

To combat the sudden changes that COVID-19 caused, The National Tuberculosis Control Program (NTP) had to change and adapt its program. With the introduction of highly infectious respiratory disease and a lockdown that essentially cut off everyone from each other, old programs can endanger those participating in this plan, meaning that these changes should

account for the nature of COVID-19. These changes and adaptations can be categorized as “Screen,” “Test and Diagnose,” “Treat,” and “Prevent.”

The first category, “Screen,” focuses on the safe screening of TB patients while being cautious of COVID-19. Patients with presumptive TB would be asked if they would have COVID-19 symptoms, and if they do have symptoms, they would still be tested for TB but directed to COVID-19 care facilities afterward. These screenings would also be limited by time slots to limit the contact people would have with each other. TB screenings would also be done virtually to reach more patients.

“Test and Diagnose” contains specific guidelines for patients to be able to be tested for COVID-19 and TB at the same time. If, during the screening, a patient is found to have either COVID-19, TB, or both, testing procedures would begin for each specific case. If needed, testing would be done at home by the patients themselves to limit contact with any suspected infected.

“Treat” discusses how the focus of treatment was shifted from having hospital and facility-based treatment to home and community-based treatment, bringing the needs closer to the patients. To achieve this, technology was used to contact and monitor patient treatment to ensure they were taking the proper doses. Family members were also asked to act as treatment supporters to help these patients. Weekly meetings would be done to check on patients, and the treatments they need to take would be delivered with tests to see how they are.

The final category, “Prevent,” aims to prevent TB from spreading to reduce incidence in the country, such as by providing TB prevention medicine to people, monitoring those in contact with TB online, and the like.

TREATMENT-BASED CHALLENGES FOR THE TB POPULATION

Healthcare services were stretched thin during these times, as most healthcare workers had to be relocated to COVID-19-related services. The process was rough, as most services suddenly lost personnel and resources couldn’t meet the demand. To specify each of the issues faced at this time, we are basing most of the issues from the report “Experiences, challenges and Looking to the Future in a Clinical Tuberculosis Cohort in the Time of COVID-19 in the Philippines” (Ferrer, J., Et Al., 2021), as this report was created by healthcare workers working in TB treatment that were suddenly transferred to COVID-19 treatment during the start of the pandemic. This paper took note of the events that happened to TB treatment and how it affected healthcare workers and the treatment participants. Their experiences will help greatly in this paper, and with the help of this report and other supplementary reports, will help give us a clear image of this context’s challenges.

The shutdown of travel did cause issues for many, as it cut off many people from each other. This shutdown made it hard for the TB researchers in the study to reach their participants. Still, more apparently, it made it hard for these participants to reach healthcare services, as there are cases where the services they need are found outside of their town or region.

The use of technology to connect one another in a time when people are forced to be separated is incredibly important, especially with this study. Although this is true, there is a limit that is based on how proficient a user is in using said technology. The Philippines currently faces issues in digital literacy, as “6% of those aged 15 and above have basic internet skills, while only 2% have standard digital skills” (Dy, J., 2022). In the context of the research, it can be seen that many patients struggled to adapt to using telephones for their TB interviews, as there was a decrease in phone interviews during the initial months of the pandemic. Digital literacy wasn’t the only limiting factor in this topic, as the quality of the technology also mattered. Issues were found in collecting data due to some patients lacking cell phones, numbers, or signals.

As the essential force in any kind of medical occasion, healthcare workers are the most important factor in healthcare. Even though this is the case, the sudden presence of COVID-19 caused a lot of disruption for many of them, which brought issues not just for the operational efficiency of these workers but even endangered their lives in some cases. There was a risk of being infected by COVID-19, as exposure to infected patients was frequent. This also caused anxiety and discrimination, as it is reported that around 28-38% of healthcare workers reported anxiety, and all of them faced discrimination from people since they faced infected patients daily.

With the pressure and fear of COVID-19 infection among people, most TB patients in the Ferrer study struggled with their mental health. One reason is that there was no regular screening among those with TB. Patients were also fearful of being infected with COVID-19 if they went out, and even if they did, they would have a hard time due to the lack of transportation. There was also stigma, as healthcare workers who came to provide medicine were seen as a bad sign due to their PPEs.

The paper “Patient- and Health-System-Related Barriers to Treatment Adherence for Patients with Drug-Resistant Tuberculosis in the Philippines: A Mixed-Methods Study” (Endo et al., 2022) discusses the issues faced by TB researchers during the first few months of the pandemic provides information on these factors and will be the basis of this section.

Treatment has struggled due to the factors of patients' lives, and with the pandemic, the issues have only gotten worse. Initiation and retention of TB treatment is a major challenge that was exacerbated by the COVID-19 pandemic; Due to the financial burden of the treatment and transportation, initiating TB treatment can be a significant stressor on individuals and households, especially those facing poverty, which might be a struggle, especially when patients are the single breadwinners in their families. For example, there are cases where patients have to stop working to finalize treatment, which can have negative consequences on other aspects of health and well-being was also a factor.

The perception of TB treatments by patients was also a challenge, as patients were concerned about being stigmatized by their family and community for having the disease, were worried about adverse drug reactions from treatment, and would even deny positive TB tests due to their perception of the disease. Retention of treatment has also been affected by this perception, as patients would completely stop treatment when they would already feel better, assuming that they are already “cured” of TB.

Family-related issues were also highlighted, as those with families had cases where their limited understanding of the disease caused a lack of psychological support, halting treatment initiation. A lack of emotional and financial support from family members also affected treatment retention. The location of patients' homes also brought issues with treatment retention, as traveling to treatment centers is a massive financial burden to those facing poverty, especially when there are times when the weather can affect their commute.

OPERATIONAL IMPROVEMENTS

Although multiple issues and factors affected the local population and healthcare services in TB treatment, adaptations to the pandemic also improved the plans and programs. The introduction of COVID-19 wasn't just a massive detriment to the country and the world, but it was also an opportunity to implement plans and ideas created before the pandemic.

The change to home and community-based treatment was an adaptation that faced some issues in its initial application, especially with the limitations due to governmental response, such as the shutdown and limitation of transportation at the start of the pandemic. Although this was the case for a while, adapting to the lessened transportation was quick, and most treatment centers could sufficiently provide for their local communities.

The use of digital technology to contact and remotely monitor patients also brought improvements to TB treatments. Through the use of Digital Adherence Technologies (DAT), nurses can bridge the physical gap between them and their patients digitally, removing the need for Directly Observed Treatment (DOT), or in other terms, removing the need for patients to visit the clinic to acquire treatment. Tele-Contact Investigation (TCI) was also used to screen multiple households through phones to observe and track TB cases.

To better combat the lack of resources and supply transportation at the start of the pandemic, motorcycle drivers, known as STRiders, were introduced. They were tasked with bringing the necessary supplies for TB treatment initiation and any other supplies needed by TB patients while also bringing TB specimen samples to clinics for testing and diagnosis. This was highly effective and efficient, as "between 2020 and 2021, the network expanded to cover all regions comprising 350 STRiders assigned to 2705 rural health units, including health centers and barangay health stations, 281 government hospitals, and 202 private hospitals." (WHO, n.d.)

Continuous Quality Improvement (CQI) was also applied to combat the burden of TB in the country. CQI was first used to research preventable diarrhea, a case similar to our preventable TB cases, and was then applied to more than 45 countries to find issues in operations. Through the use of fishbone analysis and data collection, healthcare workers can identify bottlenecks or gaps in their TB operations to improve their treatment. Through their analysis, these healthcare workers found areas to improve in TB screening, "which lead to interventions to reduce diagnostic delays, decrease missed opportunities for screening, and address challenges to reaching marginalized communities." (URC, 2023). Statistically, these changes improved TB screening and testing rates greatly, with "case notifications increasing from 120 in 2020 to 392 in 2022, the rate of bacteriologically confirmed TB cases increasing from 26% in 2020 to 65% in 2023, and diagnostic delays declining from 10 days in 2020 to 3 in 2023." (URC, 2023).

CONCLUSION

This paper aims to analyze the impact of the COVID-19 pandemic on the treatment of TB in a population and healthcare-centric context, to study the adaptations made in TB treatment during the COVID-19 pandemic, and to examine the *positive and negative impacts of the adaptations done*. Two contexts were derived from the situation in which the situation was discussed. Due to the initial governmental response to the COVID-19 pandemic, most TB services were heavily affected, with many of its pre-existing issues amplified by the pandemic, such as lack of resources and resource transport, patient-related issues, and personnel-related issues. With the issues faced, the NTP plan was then adapted to fit the current situation, which includes the shift to home and community-based treatment, the implementation of technology-based screening, and remote testing and monitoring. With these changes, improvements were seen in how TB treatment was administered and delivered.

To further comorbidity research on COVID-19 and Tuberculosis, more research on the patient-level contexts can expand on current knowledge on this case, as this research lacked the resources to collect data on these incidences. More information and graphs on the effect of COVID-19 responses on TB treatment would also help create a clearer image of how it affected services throughout the Philippines. Having firsthand information from healthcare workers and researchers who worked on TB treatment and from patients who received TB treatment during the pandemic would also help improve the points made in this paper and can even expand on the issues and adaptations discussed.

Altogether, this paper was a resounding success, as the positive and negative effects of COVID-19 response to TB treatment were seen, and the adaptations that were created to develop a more effective system in TB treatment were found to be effective not just in preventing COVID-19 spread among patients but also in improving TB treatment processes overall. As we move forward from the pandemic landscape, the lessons learned from the case of COVID-19 and TB can inform future policies, ensuring a more resilient and responsive healthcare infrastructure for infectious disease management.

REFERENCES

- ASCENT. "Philippines Scales up ASCENT's Implementation of Digital Technology for Tuberculosis Treatment." Accessed December 7, 2023. <https://www.digitaladherence.org/philippines-scales-up-ascents-implementation-of-digital-technology-for-tuberculosis-treatment/>.
- Benedicto, Jubert P., Enrick Joshua M. Cruz, and Milraam L. Quinto. "A Descriptive Study on the Clinical Profile and Outcomes of Patients with COVID-19 and Tuberculosis Co-Infection." *Acta Medica Philippina*, July 10, 2023. <https://doi.org/10.47895/amp.vi0.7855>.
- Cai, Elijah Zhengyang, Si Min Chua, Monica Tan, and Paul Anantharajah Tambyah. "Tuberculosis Care: Enhancing Directly Observed Therapy in a Peri-Urban, Low Socioeconomic Status Neighbourhood." *Singapore Medical Journal* 60, no. 7 (July 2019): 334–36. <https://doi.org/10.11622/smedj.2019072>.

- Calderon, Jeremiah S., Kelly E. Perry, Sein Sein Thi, and Lisa L. Stevens. "Innovating Tuberculosis Prevention to Achieve Universal Health Coverage in the Philippines." *The Lancet Regional Health: Western Pacific* 29 (October 6, 2022): 100609. <https://doi.org/10.1016/j.lanwpc.2022.100609>.
- Calnan, Marianne, Alexander Moran, and Hala Jassim AlMossawi. "Maintaining Essential Tuberculosis Services during the COVID-19 Pandemic, Philippines." *Bulletin of the World Health Organization* 100, no. 2 (February 1, 2022): 127–34. <https://doi.org/10.2471/BLT.21.286807>.
- Capeding, T. P. J., J. D. Rosa, H. Lam, D. G. Gaviola, A. M. C. Garfin, C. Hontiveros, L. Cunnama, et al. "Cost of TB Prevention and Treatment in the Philippines in 2017." *The International Journal of Tuberculosis and Lung Disease* 26, no. 5 (May 2022): 392–98. <https://doi.org/10.5588/ijtld.21.0622>.
- Chiang, Chen-Yuan, Tauhid Islam, Caihong Xu, Thilaka Chinnayah, Anna Marie Celina Garfin, Kalpeshsinh Rahevar, and Mario Raviglione. "The Impact of COVID-19 and the Restoration of Tuberculosis Services in the Western Pacific Region." *European Respiratory Journal* 56, no. 4 (October 1, 2020). <https://doi.org/10.1183/13993003.03054-2020>.
- "Delivering Patient-Centred Tuberculosis Care during COVID-19 in the Philippines." Accessed December 7, 2023. <https://www.who.int/about/accountability/results/who-results-report-2020-mtr/country-story/2021/philippines>.
- Dheda, Keertan, Tahlia Perumal, Harry Moultrie, Rubeshan Perumal, Aliasgar Esmail, Alex J. Scott, Zarir Udawadia, et al. "The Intersecting Pandemics of Tuberculosis and COVID-19: Population-Level and Patient-Level Impact, Clinical Presentation, and Corrective Interventions." *The Lancet Respiratory Medicine* 10, no. 6 (June 1, 2022): 603–22. [https://doi.org/10.1016/S2213-2600\(22\)00092-3](https://doi.org/10.1016/S2213-2600(22)00092-3).
- Disease Prevention and Control Bureau, National TB Control Program Adaptive Plan: Redefining The National TB Control Program in the Philippines in Time of COVID-19 Pandemic 1–42 (2021). Metro Manila, NCR; Disease Prevention and Control Bureau, Department of Health.
- Dychiao, Robyn Gayle K., Michael Paolo R. Capistrano, Gabrielle P. Flores, and Celina Daia D. Yap. "Barriers to Tuberculosis Care in the Philippines." *The Lancet. Respiratory Medicine* 10, no. 6 (June 2022): e55. [https://doi.org/10.1016/S2213-2600\(22\)00181-3](https://doi.org/10.1016/S2213-2600(22)00181-3).
- Endo, Yutaka, Jahn Jaramillo, and Rajendra Prasad Hubraj Yadav. "Patient- and Health-System-Related Barriers to Treatment Adherence for Patients with Drug-Resistant Tuberculosis in the Philippines: A Mixed-Methods Study." *Tuberculosis Research and Treatment* 2022 (November 19, 2022): 6466960. <https://doi.org/10.1155/2022/6466960>.

- Esparagoza, Corraine M. "CHALLENGES IN THE PHILIPPINE HEALTHCARE SYSTEM:," (May 2020)
- Wingfield, Tom, Marco A. Tovar, Sumona Datta, Matthew J. Saunders, and Carlton A. Evans. "Addressing Social Determinants to End Tuberculosis." *Lancet (London, England)* 391, no. 10126 (March 24, 2018): 1129–32. [https://doi.org/10.1016/S0140-6736\(18\)30484-7](https://doi.org/10.1016/S0140-6736(18)30484-7).
- Ferrer, Julius Patrick, Shuichi Suzuki, Cristelyn Alvarez, Clarinda Berido, Michelle Caballero, Bliss Caraig, Paul Ian Flores, et al. "Experiences, Challenges and Looking to the Future in a Clinical Tuberculosis Cohort in the Time of COVID-19 in the Philippines." *Transactions of The Royal Society of Tropical Medicine and Hygiene* 115, no. 6 (June 1, 2021): 579–82. <https://doi.org/10.1093/trstmh/trab025>.
- Flores, Gabrielle P, Isabelle Rose I Alberto, Michelle Ann B Eala, and Johanna Patricia A Cañal. "The Social Determinants of Tuberculosis in the Philippines." *The Lancet Global Health* 10, no. 1 (January 2022): e38. [https://doi.org/10.1016/S2214-109X\(21\)00516-7](https://doi.org/10.1016/S2214-109X(21)00516-7).
- Kampf, G., S. Scheithauer, S. Lemmen, P. Saliou, and M. Suchomel. "COVID-19-Associated Shortage of Alcohol-Based Hand Rubs, Face Masks, Medical Gloves, and Gowns: Proposal for a Risk-Adapted Approach to Ensure Patient and Healthcare Worker Safety." *The Journal of Hospital Infection* 105, no. 3 (July 2020): 424–27. <https://doi.org/10.1016/j.jhin.2020.04.041>.
- Lau, Lincoln Leehang, Natalee Hung, Daryn Joy Go, Jansel Ferma, Mia Choi, Warren Dodd, and Xiaolin Wei. "Knowledge, Attitudes and Practices of COVID-19 among Income-Poor Households in the Philippines: A Cross-Sectional Study." *Journal of Global Health* 10, no. 1 (June 2020): 011007. <https://doi.org/10.7189/jogh.10.011007>.
- MB Technews, "Improving Digital Skills in the Philippines." Accessed December 7, 2023. <https://mb.com.ph/2022/08/25/improving-digital-skills-in-the-philippines/>.
- Pedrazzoli, Debora, and Tom Wingfield. "Biosocial Strategies to Address the Socioeconomic Determinants and Consequences of the TB and COVID-19 Pandemics." *The American Journal of Tropical Medicine and Hygiene* 104, no. 2 (February 2021): 407–9. <https://doi.org/10.4269/ajtmh.20-1641>.
- "Philippines." In *The World Factbook*. Central Intelligence Agency, December 6, 2023. <https://www.cia.gov/the-world-factbook/countries/philippines/>.
- "Philippines: WHO Coronavirus Disease (COVID-19) Dashboard With Vaccination Data." Accessed December 7, 2023. <https://covid19.who.int>.
- Querri, A., A. Ohkado, S. Yoshimatsu, L. Coprada, E. Lopez, A. Medina, A. Garfin, J. Bermejo, F. Tang, and A. Shimouchi. "Enhancing Tuberculosis Patient Detection and Care through Community Volunteers in the Urban Poor, The Philippines." *Public Health Action* 7, no. 4 (December 12, 2017): 268. <https://doi.org/10.5588/pha.17.0036>.



Sanyaolu, Adekunle, Chuku Okorie, Aleksandra Marinkovic, Risha Patidar, Kokab Younis, Priyank Desai, Zaheeda Hosein, Inderbir Padda, Jasmine Mangat, and Mohsin Altaf. "Comorbidity and Its Impact on Patients with COVID-19." *SN Comprehensive Clinical Medicine* 2, no. 8 (2020): 1069–76. <https://doi.org/10.1007/s42399-020-00363-4>.

"Using a Continuous Quality Improvement Approach to Reduce the Burden of TB in the Philippines - URC," August 15, 2023. <https://www.urb-chs.com/news/using-a-continuous-quality-improvement-approach-to-reduce-the-burden-of-tb-in-the-philippines/>.

Wingfield, Tom, Fatima Karmadwala, Peter MacPherson, Kerry A. Millington, Naomi F. Walker, Luis E. Cuevas, and S. Bertel Squire. "Challenges and Opportunities to End Tuberculosis in the COVID-19 Era." *The Lancet Respiratory Medicine* 9, no. 6 (June 1, 2021): 556–58. [https://doi.org/10.1016/S2213-2600\(21\)00161-2](https://doi.org/10.1016/S2213-2600(21)00161-2).