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Cost-Effectiveness Analysis of a Latent Tuberculosis Screening Program Among Healthcare Personnel

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Abstract

Screening high-risk groups for Latent Tuberculosis Infection (LTBI) is crucial for TB elimination, as the large global reservoir of Mycobacterium tuberculosis bacilli poses a significant challenge to TB control globally. Assessing the cost-effectiveness of LTBI screening strategies is also crucial in determining the optimal approach. In 2022, Sri Lanka initiated a new program to manage latent tuberculosis infection among high-risk groups, including healthcare personnel, which recorded an 18% Latent Tuberculosis prevalence. This study aimed to evaluate the cost-effectiveness of implementing a screening program for Healthcare Personnel as part of this initiative in Sri Lanka. A decision tree model was developed to assess the cost-effectiveness of LTBI screening among Healthcare Personnel from the health system perspective, using secondary data from 2021 to 2022. The decision tree model was used to evaluate the cost-effectiveness of initiating LTBI screening for Healthcare Personnel in government hospitals. The findings are presented as the Incremental Cost-Effectiveness Ratio (ICER), compared to locally appropriate cost-effectiveness thresholds. The direct costs incurred for the standard LTBI tests and prophylaxis were assessed at the program level. The ICER represents the incremental cost of LTBI screening per Disability Adjusted Life Year (DALY) gained by preventing future active TB cases through treatment of latent TB infection. The total cost for managing an active TB case was $80.44, markedly higher than the $20.84 cost for a Latent TB case. The total cost difference between managing an active TB case and a Latent TB case was $59.60. The Incremental Cost-Effectiveness Ratio was $2381.29 per Disability Adjusted Life Year averted. The decision analysis model indicated that screening Healthcare Personnel for latent tuberculosis infection is highly cost-effective and can be recommended for implementation in Sri Lanka.

Keywords

cost-effectiveness, latent tuberculosis, healthcare personnel, tuberculosis, decision tree

- The study was conducted to address the research question of "whether the screening of Healthcare Personnel would be cost-effective to plan and implement as a new program in Sri Lanka."
- The results of the Cost-Effectiveness analysis indicate that screening the entire health worker population under the Ministry of Health for Latent Tuberculosis Infection is highly cost-effective ($2381.29 per Disability Adjusted Life Year averted) at the program level.
- The National Tuberculosis Control Program of Sri Lanka intended to implement the screening program for latent tuberculosis infection among Healthcare Personnel.[NY5]

Introduction

Screening for Latent Tuberculosis Infection is a new program implemented in 2022 by the National Program for Tuberculosis Control and Chest Diseases of the Ministry of Health, Sri Lanka to bolster the fight against Tuberculosis.[1] Even though Sri Lanka has generally favorable health indicators, the burden of TB remains persistent. Sri Lanka is a country with a moderate TB burden the recorded cases remained stagnant over the years with an incidence of 64 per 100 000 population reporting around 8000 incident active Tuberculosis cases.[2] The burden of Latent Tuberculosis in the population has not been assessed yet and has been evaluated among high-risk categories which recorded prisoners (20%)[3], and immune compromise groups (27%).[4] Among health care workers Latent Tuberculosis prevalence was 18%.[5]

In Sri Lanka, all reported TB patients are managed through the government health system under the purview of the National Program for Tuberculosis Control and Chest Diseases, placing Healthcare Personnel at risk of exposure. National Manual for TB Control[6] outlines the infection control methods, yet healthcare institutions face many challenges in adhering to Tuberculosis infection control measures. Practical Implementation issues include logistical challenges, such as limited space in Outpatient Departments and high cost of modern equipment, which make it difficult to install effective airflow systems and ventilation mechanisms.

Furthermore, the availability of personal protective equipment is limited. Some of these issues were identified by the 2018 WHO SEARO mission report,[7] which indicated that the National guidelines[6] have incorporated infection-control measures at administrative, environmental, and personnel levels. However, as previous reviews have shown, infection control measures have not been given priority in most settings, with only minimum infection control observed. The issues identified include overcrowding in OPD areas, a lack of mask use even by TB patients, and limited use of respirators by healthcare staff in OPD settings. Although inpatient facilities have improved with proper ventilation and the use of personal protective equipment by healthcare staff, the high concentration of patients in urban hospitals facilitates the further spread of TB infection, which is a known risk factor. A recent study recorded many risk factors that existed in the government hospital settings.[8] These factors collectively contribute to a higher exposure level of Healthcare Personnel to undiagnosed or diagnosed TB cases that are managed in government hospitals, justifying the need for regular screening in hospital settings.

The health workforce of the country comprises skilled professionals who require years of training. Losing their services can significantly impact the health system, economy, and the country's overall health status.[9] Maintaining the health of workers in occupational settings is a key priority under the country's occupational health policy. The World Health Organization has recommended including healthcare personnel in the screening of latent tuberculosis infection to achieve the intended benefits.[10]

Although the health care related costs are rising globally the budgetary allocations are limited for health care in the country. The National TB-related budget of Sri Lanka in 2018 was 8.4 million US Dollars, with 44% from domestic funds and 45% from international sources, while the remaining activities were unfunded.[11] Given the current economic crisis and resultant inflation, these budgets are expected to rise further in the future. To maintain the TB control program while targeting END TB with new strategies like screening for Latent Tuberculosis in Sri Lanka, the control activities must be prioritized. Mathematical modeling on TB transmission was used to examine cost-effective TB control priorities in Sri Lanka. The 2 most impactful interventions found were timely access to TB diagnostics and improved diagnostic algorithms, which can reduce TB incidence by 40%.[11] The LTBI management was a key strategy to reduce TB incidence in the country, targeting the control of the reservoir of Mycobacterium Tuberculosis, from which the incident cases emerge.

Assessing the cost-effectiveness of the screening program is crucial before its implementation, particularly in a setting like Sri Lanka where healthcare services are provided free of charge at the point of delivery.

This study employed a Cost-Effectiveness Analysis, a widely used approach in the health sector that enables policymakers and health planners to make rational decisions regarding resource allocation at the national level.[12]

The new health program aims to improve the detection and management of the Latent state of Tuberculosis through targeted screening of high-risk populations, including Healthcare Personnel.

To provide scientific evidence for this initiation, this study aimed to evaluate the cost-effectiveness of including Healthcare Personnel in the screening program and introducing preventive treatments for latent tuberculosis infection in the future.

Methods

A decision analysis model[13] was developed, to evaluate the relative cost-effectiveness measure of Latent Tuberculosis screening comparing the scenario where no intervention for a certain disease or risk factor has been made to the scenario where an intervention is implemented. Cost-effectiveness analysis defined as the cost incurred to get a given health outcome (life years gained/lives saved).[12]

The cost-effectiveness for screening and managing latent TB cases was depicted as an incremental cost-effectiveness ratio (ICER) as the outcome of this study.

We assessed the costs and effectiveness for the healthcare worker population of Sri Lanka under the Ministry of Health in the context of the government health system perspective, under 2 scenarios. A decision tree model was built to decide

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on the best scenario; not screening for Latent TB/the current practice (scenario 1) versus screening and giving prophylaxis treatments to latent TB (scenario 2) for healthcare personnel. Ethical approval was obtained from the ethics review committee of the Faculty of Medicine, Colombo.

Assessment of Costs

The costs were assessed from the health system's perspective. The total direct costs related to investigations and treatments were calculated. The direct healthcare costs for screening and treating LTBI and TB patients were assessed using secondary data. The costs for screening, diagnosis, and treatment of an active TB patient were obtained from the National Program for Tuberculosis Control and Chest Diseases (NPTCCD). The direct healthcare costs for screening, diagnosing, and treating each active TB patient were calculated.

All costs were valued at the end of year 2021 and calculated in Sri Lankan Rupees (SLR) and USD, wherein 200 SLR equals 1 USD 200. The time horizon considered for this study was 2 years. The margin of cost-effectiveness or ICER threshold was capped at SLR 12,470.91 as of 3 times Gross Domestic Product (GDP) per capita.[14] In the year 2021, the Sri Lankan Gross Domestic Product per capita was last recorded at 4156.97 US dollars.[15] Hence if the calculated ICER value is less than the recommended ceiling value ($3 \times 4{,}156.97 = 12{,}470.91$)[14] it was decided as a cost-effective program. Further as indicated, If the ICER is below GDP per capita of 4156.97 US dollars it was recommended to be a highly cost-effective health program.

Assessment of Effectiveness Parameters

Effectiveness was measured in terms of the outcome value of Disability Adjusted Life Years (DALY) averted, estimating the DALYs gained by preventing future active TB cases through treatment of the Latent TB stage. The DALYs attributed to an individual case of LTBI were assumed to be equivalent to those of a TB-free healthy individual, as LTBI cases are asymptomatic and maintain a functional state.

Disability-adjusted life Years were estimated in alignment with the WHO Global Burden of Disease Study 2019.[16] The DALY values were calculated by summing the tuberculosis-related DALY values for the age groups that were comparable to the Healthcare Personnel in the study population.

Building the Decision Tree

A decision tree was constructed to model was developed using Tree Age software version 19. The model was constructed in concordance with the high-risk groups LTBI screening guideline from NPTCCD Sri Lanka.[1] The decision tree included 2 scenarios: screening healthcare personnel for LTBI and not screening them. All possible outcomes related to screening or not screening a healthcare worker were depicted in the decision tree. The model was branched out based on the variables associated with the onset, progression, and outcomes of latent tuberculosis infection assuming the probability values for a single HCW entering the decision tree matrix.

a. Overall proportion of LTBI cases among healthcare personnel
b. The overall proportion of non-LTBI individuals among healthcare personnel
c. The proportion of active TB cases progressed from the LTBI state.
e. The proportion of Treatment response of TB cases
e. Outcomes in terms of cured/death of overall LTBI cases
f. Outcomes in terms of cured/death of overall TB cases.
g. Total costs of treatments for LTBI and TB cases
h. DALY calculated for both LTBI and TB cases in both screened and non-screened scenarios

The probabilities assigned to each branch were based on the literature evidence on the reported prevalence of LTBI among healthcare personnel,[17] as well as evidence from the Annual TB Report Sri Lanka 2020.[2]

Figure 1 illustrates the decision tree matrix. The decision tree displayed the variables along with their corresponding probability values.

Assessment of Incremental Cost-Effectiveness Ratio (ICER)

The screening of HCWs for LTBI is a program-level decision. Therefore, the cost-effectiveness had to be estimated for the country at the program level. The ICER was calculated for the screening program involving the total Health Care Worker population under the Ministry of Health in Sri Lanka. Hence, the estimated costs and DALYs calculated by the decision analysis model were extrapolated to the total HCWs population (n = 121 500) under the Health Ministry of Sri Lanka.[18] The numerator represents the cost difference/incremental cost of screening and managing latent tuberculosis, while the denominator denotes the effectiveness of DALYs.

All the cost values of both the screening and non-screening arms of the decision tree were calculated for the estimated number of HCWs. The total cost values were discounted at a 5% level.[14,19] The cost differences between the 2 arms were then assessed at the program level and used as the numerators for the ICER calculation. Similarly, the DALYs between the screen and non-screen arms were calculated at the program level, with the total DALY values discounted at a 5% level. The difference between the calculated DALY values was used as the denominator of the ICER. The

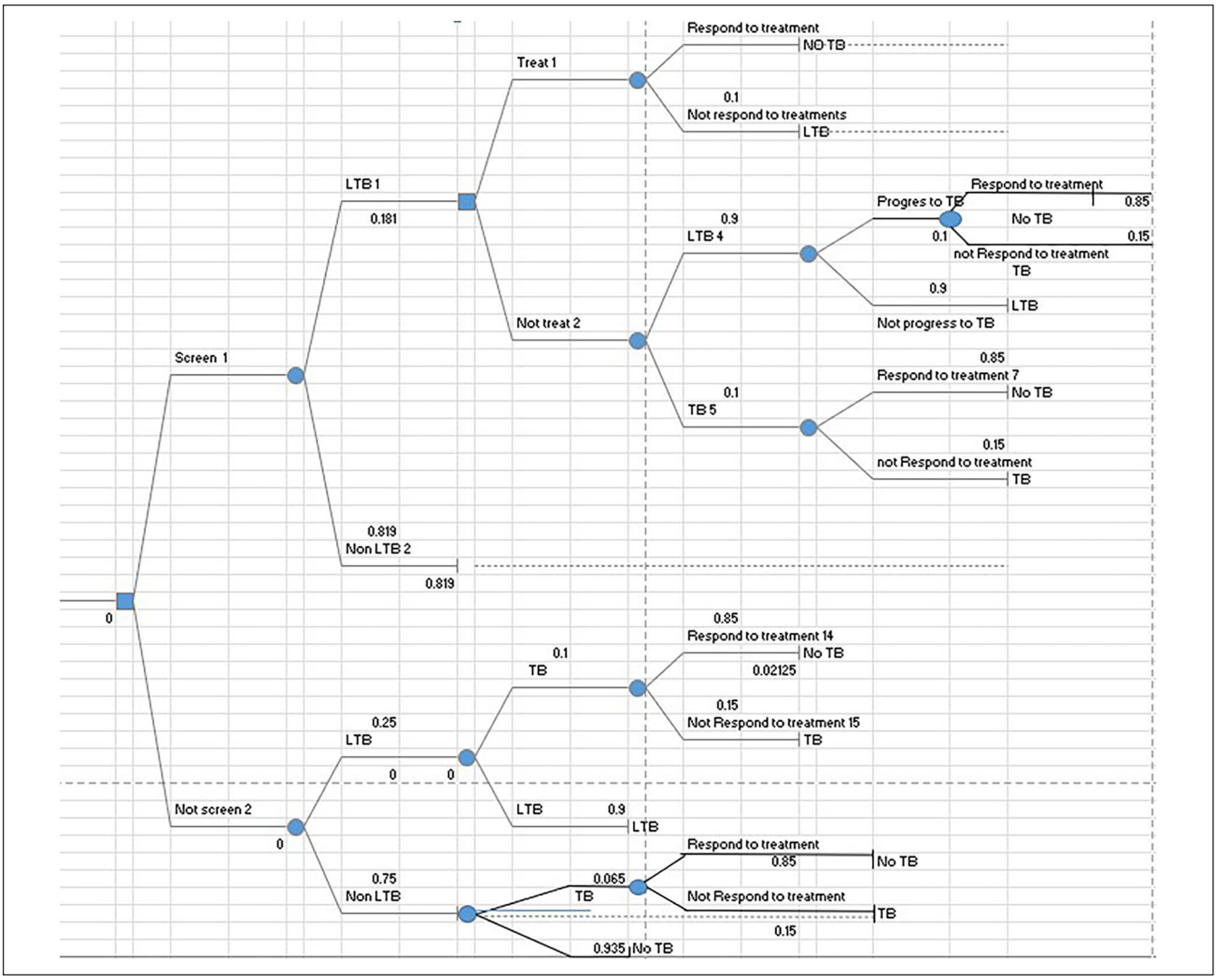

Figure 1. The decision tree displayed the variables along with their corresponding probability values.

estimated final cost and DALY values were incorporated, and the incremental cost-effectiveness ratio was estimated.

To determine if the intervention is cost-effective, the cost per DALY gained from the screening for Latent TB was compared to locally appropriate willingness-to-pay thresholds at the health system level.[19] Interventions that fell below this threshold were considered an efficient allocation of healthcare resources.

Results

Our analysis assessed the incremental cost to the health system of screening a healthcare worker for latent tuberculosis infection.

Calculation of Cost for Managing TB /LTBI

Table 1 outlines the costs associated with managing a TB case and an LTBI case, including the cost differences of individual components. The basic investigations conducted for an uncomplicated pulmonary TB patient were considered. The total cost of managing a TB case is $80.44.

According to the LTBI guidelines published in 2022 by NPTCCD, 2 preventive treatment regimens are recommended, and the choice was given to the treating clinicians to select the best option. The preferred regimen is INAH and Rifapentin. Therefore, for the final cost assessment, the cost of the INAH + Rifapentin regimen was included.[1] The cost of managing an LTBI case is $20.85. The total cost difference between managing a TB case and an LTBI case was $59.60.

Table 2 compares the costs of managing a TB case and a Latent TB case. The total cost was higher for a TB case at $80.44 compared to $20.84 for a Latent TB case.

Calculation DALY Related to Tuberculosis

Table 3 presents the estimated costs and DALYs for the screening arm and the non-screening arm. The total calculated DALY value was 51.3 per 1000 population.

Table 1. Costs of Managing a TB Case and a LTBI Case With Cost Difference of Individual Components by NPTCCD in 2022.

Direct medical cost type	TB case (USD)	Latent TB case (USD)	Cost difference (USD)
Investigations	75.44	10.52	64.92
Drugs	5	10.32	−5.32
Total	80.44	20.84	59.60

Source. NPTCCD (National Program for Tuberculosis Control and Chest Diseases).

Table 2. Comparison of Costs of Managing a TB Case and a Latent TB Case by NPTCCD in 2022.

Cost type	Cost centers	TB case (USD)	Latent TB case (USD)
Direct medical cost	Investigations	75.44	10.52
	Drugs	5	10.32
Total cost difference		80.44	20.84

Source. NPTCCD (National Program for Tuberculosis Control and Chest Diseases).

Table 3. Estimated Costs and DALYs for Screening and Non-Screening of Healthcare Personnel Under the Ministry of Health Sri Lanka in 2022 Based on the Decision Tree.

Decisions	Cost	Effect/DALY
The decision Screening LTBI	$1 485454.9	102.08
The decision Non-Screening LTBI	$686 029.5	437.79
Incremental Cost-Effectiveness Ratio = Added cost /DALY averted	$799 425.4 (Added cost)	335.71 (DALY averted)
	$ 2381.29/DALY	

Calculation of ICER

The ICER was assessed by dividing the differences in costs by the differences in DALY values. The incremental cost-utility of screening HCWs for LTBI is estimated to be 2381.29 US Dollars per DALY averted if the screening program involves total HCWs (n = 121 500) population.

Discussion

Our cost-effectiveness analysis suggests that in government hospital settings, where TB patients are most likely to seek treatment, screening Healthcare Personnel for Latent Tuberculosis offers significant benefits at a low cost. The ICER of $2381.29 per DALY averted is considered highly cost-effective, which states that interventions with an ICER below the country's GDP per capita are considered very cost-effective.[14] The value for managing a Tuberculosis patient was way higher than a Latent tuberculosis patient with a total cost difference of $59.60 which can be saved for the system.

The current health system's context for tuberculosis management is conducive to initiating the new screening program within existing resources. The screening of Healthcare Personnel can be implemented through chest clinics nationwide, utilizing the available facilities for TB screening and management within the government healthcare system. Additionally, preventive treatments can be initiated, as the necessary prophylaxis is already included in the National Treatment Guidelines and Protocols[1] and is available in the chest clinics. Based on these findings, the integration of a routine screening program for latent TB among Healthcare Personnel within the existing healthcare infrastructure in Sri Lanka is practically feasible through the existing system.

Many countries have evaluated the implementation of screening Healthcare Personnel for latent tuberculosis infection. Economic evaluations have found that while universal screening may yield better health outcomes, it may also be less efficient and potentially unaffordable. In contrast, a targeted approach to LTBI screening for Healthcare Personnel could prove to be a highly cost-effective strategy in hospital settings.

A study done in Singapore evaluated the cost-effectiveness and implications on the budget of the targeted versus universal screening of HCWs. Singapore is an intermediate TB burden country similar to Sri Lanka. The study was done in a tertiary hospital in Singapore. The decision analysis method was used. It concluded that targeted LTBI screening in HCWs could be highly cost-effective in hospital settings like Singapore furthermore inclusive screening strategies could yield better outcomes.[20]

A technical report on "Cost-effectiveness analysis of programmatic screening strategies for latent tuberculosis infection in the European Union" examined various screening

approaches for LTBI among high-risk populations in low-burden TB countries across Europe.[21] The report concluded that LTBI screening, in general, was a cost-effective policy option for the European countries studied.

In North America, tuberculosis incidence has declined substantially, and the risk to Healthcare Personnel has diminished. Researchers have evaluated the cost-effectiveness of 3 potential strategies for ongoing screening of Healthcare Personnel. They found that annual tuberculosis screening appears to be poorly cost-effective for most North American Healthcare Personnel, suggesting a need to reconsider screening practices due to the low annual risks of infection in settings with low TB prevalence. The research suggests that resources can be effectively utilized for TB prevention through activities aimed at ending TB in these countries.[22]

The Canadian Agency for Drugs and Technologies in Health has provided evidence-based guidelines for "testing for latent tuberculosis infection in people with a risk of occupational exposure to tuberculosis."[23] Key recommendations include as a baseline, "All Healthcare Personnel should be screened, including a symptom evaluation and tests for those without documented prior TB disease or LTBI, and the results should be interpreted based on individual risk. Following a known exposure, all Healthcare Personnel should be evaluated for symptoms, and testing should be decided based on the baseline test results." In the Sri Lankan context, prospective Healthcare Personnel employed by the Ministry of Health must undergo a mandatory medical examination, including basic investigations. The National Program for Tuberculosis Control and Chest Diseases plans to incorporate a baseline TB screening test, in addition to the routine Chest X-ray, to establish a database of Healthcare Personnel' Tuberculin test results. This will serve as a strong foundation for the new screening program. While studies from other countries have found that screening Healthcare Personnel for latent tuberculosis infection is cost-effective, generalizing these results to the Sri Lankan context may be challenging. Sri Lanka's healthcare system provides free services at the point of delivery, funded by public resources rather than an insurance-driven model. Despite Sri Lanka's notable achievements in communicable disease control and elimination, the burden of tuberculosis remains moderate, with stagnant yearly reported new cases. According to WHO estimates, there is a gap between reported and estimated TB cases in the country. Addressing this issue within the existing system is crucial, as further service expansion is constrained by the current economic crisis in Sri Lanka. Therefore, generating evidence on new strategies and evaluating their cost-effectiveness in the local context should be prioritized, similar to the approach taken in other countries.

This economic analysis is further justified by Sri Lanka's state health institutions providing free care at the point of delivery. However, rising global healthcare costs pose a challenge to service provision, as budgetary allocations for the health sector are limited. Therefore, this analysis is beneficial for optimizing resource utilization and identifying new, highly effective strategies for the National Program for Tuberculosis Control and Chest Diseases of Sri Lanka.

Implementing an LTBI screening program could also enhance the safety of the healthcare workforce, as supported by the evidence from this research. Treating LTBI as a new strategy to target the reservoir of TB bacilli could aid Sri Lanka in achieving its END TB targets. Initiating and scaling up screening programs, starting with high-risk groups, would help ensure the smooth and feasible implementation of the new program within the available resources and sustain its integration into the Sri Lankan healthcare system. The stagnant burden of TB disease, significant economic losses due to TB-related morbidity and mortality, and the relatively low costs of providing treatment all support the urgent need for increased investment in TB control efforts, including workplace screening programs. The results of this cost-effectiveness analysis highlight the value of proactively screening Healthcare Personnel for LTBI to reduce the overall burden of TB and prevent transmission within healthcare settings.

The implementation of a routine screening program for latent tuberculosis infection among Healthcare Personnel in Sri Lanka, integrated into the existing healthcare infrastructure, is recommended as a highly cost-effective strategy to reduce the burden of TB among this high-risk population.

Limitations

This research was focused on the healthcare worker population in Sri Lanka, and the findings may not be generalizable to other settings or populations. The cost assessment was based on extrapolating the total healthcare worker population. The direct costs of the standard latent tuberculosis infection tests at the program level were evaluated. Indirect costs were excluded, as all estimates were based on future projections. The values were calculated in 2021 when the US dollar exchange rate was 200 Sri Lankan rupees. Due to high inflation in 2021 and 2022 from the economic crisis, the Sri Lankan rupee has since depreciated. Therefore, the cost analysis was primarily conducted in US dollars to mitigate the impact of inflation. Given that Healthcare Personnel' exposure to TB infection is an ongoing process in their routine occupational settings, the screening program must be carried out regularly. The program was planned to be implemented every 2 years, and the cost was estimated accordingly. Therefore, an advanced Markov model and sensitivity analysis were not conducted, as the program's cost was not assessed for a longer duration.

Conclusion

The decision analysis concluded that screening Healthcare Personnel for latent tuberculosis infection is highly cost-effective. If the entire health worker population under the Ministry of Health were screened for latent tuberculosis

infection, the estimated incremental cost-effectiveness ratio would be $2381.29 per disability-adjusted life year averted. Therefore, the new program for screening Healthcare Personnel for latent tuberculosis infection in Sri Lanka could be recommended for implementation.

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Author Contributions

Niludi R. Yasaratna & Manuj Chrishantha Weerasinghe designed the study. Niludi R. Yasaratna conducted the study, interpreted the data and wrote the first draft of the manuscript. Manuj Chrishantha Weerasinghe critically revised the manuscript. All the authors reviewed the final draft of the manuscript and agreed to submitting it.

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References

1. NPTCCD. *National Guidelines on Latent Tuberculosis Infection Management*. 2022.
2. National Program for Tuberculosis Control & Chest Diseases Sri Lanka. Annual report. 2020.
3. Senevirathna S, Madegedara D, Edirisinghe R, et al. A study on prevalence of latent tuberculosis in prison inmates of a single outdoor prison in central Sri Lanka. *Eur Respir J*. 2020;56: 511. doi:10.1183/13993003.congress-2020.511
4. Madegedara D, Perera B, Senevirathna S, et al. Prevalence of latent tuberculosis in patients with chronic kidney disease of non diabetic origin in central Sri Lanka. *Eur Respir J*. 2020;56(suppl 64):1672. doi:10.1183/13993003.congress-2020.1672
5. Nandasena S. Abstracts of oral and poster presentations: 28th annual academic sessions of the college of community physicians of Sri Lanka. *J Coll Community Physicians Sri Lanka*. 2023;29:1-99. doi:10.4038/jccpsl.v29i5.8633
6. National Program for Tuberculosis and Chest Diseases. *National Manual for Tuberculosis Control*; 2021. https://www.nptccd.health.gov.lk/wp-content/uploads/2022/05/National-Manual-for-TB-Control-2022update.pdf
7. Vineeth Bhatia WS. RGLC Country Support Mission Report. 2018.
8. Yasaratna NR, Weerasinghe MC. Risk factors for latent tuberculosis among health - care workers in Sri Lanka. *WHO South-East Asia J Public Heal*th. 2024;13(1):9-15. doi:10.4103/WHO-SEAJPH.WHO-SEAJPH
9. Ministry of Health Sri Lanka and World Health Organization. *Health Labour Market Analysis*; 2018. https://iris.who.int/handle/10665/324911
10. WHO. *Latent Tuberculosis Infection. Updated and Consolidated Guidelines for Programmatic Management*. World Heal Organization; 2018. (June), p.78. doi:10.1056/NEJMcp021045
11. Azim T, Bhatia V, Nunn P, Sirinirund P, Senanayake S. *Ending Tuberculosis and AIDS in Sri Lanka: Urgent and Immediate Actions Required to Reach 2025 Targets*. Published online 2018.
12. Hutubessy R, Chisholm D, Tan-Torres Edejer T, WHO-CHOICE. Generalized cost-effectiveness analysis for national-level priority-setting in the health sector. *Cost Eff Resour Alloc*. 2003;1(8):1-13. http://www.resource-allocation.com/content/1/1/8
13. Sonnenberg FA, Roberts MS, Tsevat J, Wong JB, Barry M, Kent DL. Toward a Peer Review Process for Medical Decision *Analysis Models. Med Care*. 1994;32(7):52-64. https://www.jstor.org/stable/3766447
14. Gamage AU, Abeysena C. Health technology assessment (HTA) and health policy making: a narrative review. *J Coll Community Physicians Sri Lanka*. 2020;26(3):175. doi:10.4038/jccpsl.v26i3.8271
15. World Bank. Sri Lanka GDP per capita - 2022 Data - 2023 Forecast - 1961-2021 Historical - Chart. Published 2022. Accessed July 17, 2022. https://tradingeconomics.com/sri-lanka/gdp-per-capita
16. Global Health Estimates 2021: Disease burden by Cause, Age, Sex, by Country and by Region, 2000-2021. Geneva, World Health Organization; 2024. https://cdn.who.int/media/docs/default-source/gho-documents/global-health-estimates/ghe2021_daly_bycountry_2020.xlsx?sfvrsn=592af661_5
17. Apriani L, McAllister S, Sharples K, et al. Latent tuberculosis infection in healthcare workers in low- and middle-income countries: an updated systematic review. *Eur Respir J*. 2019;53(4):1801789. doi:10.1183/13993003.01789-2018
18. Ministry of Health N and IM and Ministry of Health. Staff Access. Published 2022. Accessed July 17, 2022. http://www.previousmoh.health.gov.lk/moh_final/english/staff.php?pid=22
19. Leech AA, Kim DD, Cohen JT, Neumann PJ. Use and misuse of cost-effectiveness analysis thresholds in low- and middle-income countries: trends in cost-per-DALY studies. *Value Health*. 2018;21(7):759-761. doi:10.1016/j.jval.2017.12.016
20. Png ME, Yoong J, Ong CWM, Fisher D, Bagdasarian N. A screening strategy for latent tuberculosis in healthcare workers: Cost-effectiveness and budget impact of universal versus targeted screening. *Infection Control & Hospital Epidemiology*. 2019;40(3):341-349. doi:10.1017/ice.2018.334.
21. ECDC (European Centre for Disease Prevention and Control). Cost-Effectiveness Analysis of Programmatic Screening Strategies for Latent Tuberculosis Infection in the EU/EEA. 2018. doi:/10.1186/1471-244X-13-140
22. Mullie GA, Schwartzman K, Zwerling A, N'Diaye DS. Revisiting annual screening for latent tuberculosis infection in healthcare personnel: a cost-effectiveness analysis. *BMC Med*. 2017;15(1):104-115. doi:10.1186/s12916-017-0865-x
23. Khangura SD, Severn M. Occupational screening for latent tuberculosis infection. *Can J Heal Technol*. 2021;1(9):1-9. doi:10.51731/cjht.2021.144