

High Prevalence of Latent Tuberculosis Infection among People Living with HIV in Thailand, 2022

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Background

- Thailand is listed among the top 20 countries worldwide with the highest estimated tuberculosis (TB) incidence, with a rate of 143 cases per 100,000 individuals. Moreover, the 2022 WHO Global Tuberculosis Report projected that there were 8,900 new TB incidence cases among people living with HIV (PLWH) and 1,700 TB-related deaths within this population^{[1], [2]}.
- To reduce TB incidence and TB mortality, scaling up TB active case findings, provision of TB treatment, and TB preventive therapy (TPT) are essential. However, uptake of TPT among PLWH was lower than 0.5% in 2020^[3].
- According to Thailand's National Guidelines on HIV/AIDS Treatment and Prevention 2021/2022, short-course TPT regimens (3HP or 1HP) are preferred regimens for the following PLWH^[4]:
 - Newly diagnosed PLWH with CD4 < 200 cells/mm³ who are ART naïve or have received ART for less than 12 months
 - Newly diagnosed PLWH and PLWH currently on ART with CD4 ≥ 200 cells/mm³ who test positive for the latent tuberculosis infection (LTBI) screening using methods such as TST (tuberculin skin test) or IGRA (interferon gamma release assay)
 - PLWH, who are exposed to pulmonary TB or laryngeal TB during the past 12 months
 - Prisoners living with HIV
- LTBI screening and treatment among PLWH in Thailand face barriers such as concerns over TPT side effects and INH resistance, limited availability of new TPT regimens, and restricted access to IGRA and TST in certain settings.
- Limited studies on LTBI prevalence among PLWH in Thailand, along with clinicians' concerns about undiagnosed TB and associated risk factors, also restrict TPT implementation^{[5]-[7]}.
- Multiple studies conducted in Thailand have indicated that the estimated prevalence of LTBI among non-PLWH is approximately 16%^{[8]-[10]}.

Objectives

- This analysis aims to assess the prevalence of LTBI among PLWH in 5 healthcare facilities in Bangkok, Thailand.
- The insights gained from this analysis will be utilized to inform policymakers and key stakeholders on the current situation of LTBI among PLWH. Data will be used to support the revision of the TPT algorithm among PLWH in Thailand.

Method

- Design:** We conducted a secondary data analysis using the TPT database maintained by the Thailand Ministry of Public Health for PLWH (TPT/HIV database). Data from 5 healthcare facilities in Bangkok were analyzed.
- Participants:** PLWH who had no history of TB or LTBI were included in the analysis. PLWH were screened for LTBI using IGRA testing regardless of age, sex, gender, ethnicity, gender identity, key population status, healthcare scheme, CD4 count, or antiretroviral therapy (ART) status.
- Data Collection:** March 2022 to October 2022
 - T-Spot TB tests, manufactured by Oxford Immunotec in Abingdon, UK, were used. These tests have shown a sensitivity of 97% and a specificity of 92% for LTBI screening^{[11], [12]}.
 - All eligible PLWH voluntarily underwent IGRA testing using the T-Spot TB tests. In accordance with national policy, the results were documented in the TPT/HIV database, along with additional information such as demographic data, ART status, CD4 count, and the presence or absence of LTBI.
- Data Analysis:** Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. The prevalence of LTBI among PLWH was estimated, along with 95% confidence intervals, and univariate and multivariate logistic regression analyses were conducted to identify factors associated with LTBI among PLWH. Factors with p-value ≤ 0.3 were included in the multivariate logistic regression analysis.

Results

- Out of 888 PLWH who underwent IGRA screening, 20.4% (181/888) tested positive. The median age of the participants was 38 years, with 612 (68.9%) being male. Among the participants, 667 (75.1%) were Thai, and 642 (77.3%) were ART naïve.
- Among the 872 PLWH with available CD4 results, approximately 20% tested positive across all CD4 categories, except for those with CD4 counts less than or equal to 50 cells/mm³, where only 0.6% (1/181) of those tested positive.

Table 1 – Demographic and clinical characteristics of PLWH by IGRA test results, Bangkok, March – October 2022

Characteristics	N	Overall N = 888	IGRA Positive N = 181 (20.4%)	IGRA Negative N = 707 (79.6%)
Age, Median (IQR)	823	38 (29, 47)	41 (34, 49)	37 (29, 47)
Age group (years), n (%)	823			
1-29		212 (25.8%)	26 (15.8%)	186 (28.3%)
30-44		336 (40.8%)	72 (43.6%)	264 (40.1%)
45-59		251 (30.5%)	61 (37.0%)	190 (28.9%)
≥60		24 (2.9%)	6 (3.6%)	18 (2.7%)
Sex, n (%)	888			
Female		276 (31.1%)	51 (28.2%)	225 (31.8%)
Male		612 (68.9%)	130 (72.8%)	482 (68.2%)
Nationality, n (%)	888			
Thai		667 (75.1%)	136 (75.1%)	531 (75.1%)
Non-Thai		221 (24.9%)	45 (24.9%)	176 (24.9%)
General population, n (%)	888			
Healthcare coverage scheme, n (%)	881			
Universal Coverage Scheme		326 (37.0%)	64 (36%)	262 (37.3%)
Social Security Scheme		262 (29.7%)	54 (30.3%)	208 (29.6%)
Civil Servants Medical Benefit Scheme		42 (4.8%)	8 (4.5%)	34 (4.8%)
Private Insurance		7 (0.8%)	2 (1.1%)	5 (0.7%)
Non-Thai/No Healthcare Coverage		213 (24.2%)	42 (23.6%)	171 (24.3%)
Others		31 (3.5%)	8 (4.5%)	23 (3.3%)
CD4 within 6 months of IGRA testing, n (%)	872			
0-50		18 (2.1%)	1 (0.6%)	17 (2.5%)
51-100		18 (2.1%)	4 (2.2%)	14 (2.0%)
101-200		55 (6.3%)	12 (6.7%)	43 (6.2%)
201-350		171 (19.6%)	32 (17.7%)	139 (20.1%)
>350		610 (70.0%)	131 (72.8%)	479 (69.2%)
ARV status at IGRA test, n (%)	831			
Naive		642 (77.3%)	133 (79.2%)	509 (76.8%)
Experienced		189 (22.7%)	35 (20.8%)	154 (23.2%)

- Factors associated with positive IGRA results included PLWH in the 30-44 (AOR: 2.03, 95% CI 1.24-3.43) and 45-59 (AOR: 2.30, 95% CI 1.31-4.11) age groups after adjusting for other variables.
- However, the association between positive IGRA results and PLWH in the ≥60 age group yielded an AOR of 2.37 (95% CI: 0.78-6.51), which was not statistically significant due to the small sample size.
- Nationality, CD4 count, sex, gender, and ART status were not significantly associated with positive IGRA results.

Table 2 – Demographic and Factors Associated with IGRA Test Results, Bangkok, March – October 2022

Characteristic	Overall N	IGRA Positive n ¹ = 181	OR ²	Univariate 95% CI ²	p-value	Multivariate (n=808) AOR ²	95% CI ²	p-value
Age Group, (Years)								
1-29	212	26 (12.3%)	-	Ref.		-	Ref.	
30-44	336	72 (21.4%)	1.95	1.21, 3.22	<0.01	2.03	1.24, 3.43	<0.01
45-59	251	61 (24.3%)	2.30	1.41, 3.85	<0.01	2.30	1.31, 4.11	<0.01
≥60	24	6 (25.0%)	2.38	0.81, 6.29	0.09	2.37	0.78, 6.51	0.11
(Missing)	65	16 (24.5%)						
Sex								
Female	276	51 (18.5%)	-	Ref.		-	Ref.	
Male	612	130 (21.2%)	1.19	0.83, 1.72	0.30	1.50	0.98, 2.31	0.06
Ethnicity								
Thai	667	136 (20.4%)	-	Ref.		-	Ref.	
Non-Thai	221	45 (20.4%)	1.00	0.68, 1.45	>0.9			
General Population³	545	121 (22.2%)	1.35	0.96, 1.91	0.09	1.20	0.77, 1.86	0.40
Healthcare Scheme								
Universal Coverage Scheme	326	64 (19.6%)	-	Ref.		-	Ref.	
Civil Servant Medical Benefit Scheme	42	8 (19.0%)	0.96	0.40, 2.09	>0.9			
Social Security Scheme	262	54 (20.6%)	1.06	0.71, 1.59	0.80			
Private Insurance	7	2 (28.6%)	1.64	0.23, 7.79	0.60			
No Healthcare Coverage Scheme	213	42 (19.7%)	1.01	0.65, 1.55	>0.9			
Others	31	8 (25.8%)	1.42	0.57, 3.21	0.40			
(Missing)	7	3 (42.9%)						
CD4 Count (cells/mm³) Within 6 Months of IGRA Testing								
>350	610	131 (21.5%)	-	Ref.		-	Ref.	
0-50	18	1 (5.6%)	0.22	0.01, 1.06	0.14	0.22	0.01, 1.12	0.15
51-100	18	4 (22.2%)	1.04	0.29, 2.97	>0.9	1.21	0.33, 3.55	0.70
101-200	55	12 (21.8%)	1.02	0.50, 1.93	>0.9	1.07	0.51, 2.10	>0.9
201-350	171	32 (18.7%)	0.84	0.54, 1.28	0.40	0.84	0.51, 1.32	0.50
(Missing)	16	1 (6.3%)						
ARV Status								
Naive	642	133 (20.7%)	-	Ref.		-	Ref.	
Experienced	189	35 (18.5%)	0.87	0.57, 1.30	0.50			
(Missing)	57	13 (22.8%)						

¹ n (%)
² OR = Odds Ratio, AOR = Adjusted Odds Ratio, CI = Confidence Interval
³ General Population: PLWH who were not identified as men who have sex with men, transgender persons, people who inject drugs, sex workers, or pregnant women

Limitations

- The data were collected from PLWH who tested for T-Spot TB test at 5 healthcare facilities in Bangkok between March and October 2022, which may limit the generalizability of the findings to other provinces or regions.
- Data on other risk factors, such as smoking, malnutrition, non-communicable diseases (including diabetes mellitus), and substance abuse were not collected or partially collected in the TPT/HIV database, which could have impacted the prevalence estimates and risk analysis^{[5], [13], [14]}.
- The study design was cross-sectional, which limits the ability to establish causality^{[15], [16]}.

Conclusions

- A higher prevalence of LTBI was observed among Thai PLWH at 20% compared to healthy Thai adults reported at approximately 16%.
- The analysis identified a high prevalence of LTBI among 30-59 years old PLWH.
- The T-Spot IGRA results ranged from 19-22% in all CD4 levels, except for individuals with very low CD4 counts (≤50 cells/mm³) at 6%.
- Further research is needed to assess the feasibility and cost-effectiveness of implementing TPT using IGRA-guided LTBI diagnosis among PLWH, comparing it to TPT for all PLWH based on WHO guidelines, as outlined in the national TB/HIV guidelines.

Acknowledgements

The authors express their gratitude to all stakeholders, patients, healthcare providers, and staff for their unwavering support and dedication to the successful implementation of the project. We acknowledge the invaluable contributions of our partners, as follows:

- Public Health Center 28, Health Department, Bangkok Metropolitan Administration, Bangkok, Thailand
- Taksin Hospital, Medical Service Department, Bangkok Metropolitan Administration, Bangkok, Thailand
- Klang General Hospital, Medical Service Department, Bangkok Metropolitan Administration, Bangkok, Thailand
- Division of Infectious Diseases, Department of Internal Medicine, Phramongkutklao Hospital and College of Medicine, Bangkok, Thailand
- Sirindhorn Hospital, Medical Service Department, Bangkok Metropolitan Administration, Bangkok, Thailand
- Division of AIDS and STIs, Department of Disease Control, Thailand Ministry of Public Health, Nonthaburi, Thailand
- Division of Tuberculosis, Department of Disease Control, Thailand Ministry of Public Health, Bangkok, Thailand
- Division of Global HIV and Tuberculosis, U.S. Centers for Disease Control and Prevention, Bangkok, Thailand

Funding

- The funding for this project was provided by the President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention (Cooperative Agreement 5U2GGH0001923)
- The findings and conclusions in this presentation solely reflect the views of the authors and do not necessarily represent the official position of the funding institutions.

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