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DISEASES AND RISK FACTORS CORRELATED WITH TUBERCULOSIS IN SRI LANKA AND BELARUS

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Resume. Tuberculosis remains the second deadliest infectious disease after COVID-19, with 10.6 million cases and 1.6 million deaths in 2021. South-East Asia bears 46 % of global cases, including 11 % children.

Keywords: *Tuberculosis, Incidence, Males, Females, Age groups*

Actuality. Tuberculosis (TB) remains a major global health challenge, ranking as the second leading infectious cause of death after COVID-19. In 2022, about 10.6 million people worldwide were infected with TB, marking a significant public health concern. New TB diagnoses reached 7.5 million in 2022, the highest number reported since 1995, indicating a resurgence or better detection of the disease. TB caused approximately 1.6 million deaths in 2021, underscoring its severity and impact on global mortality. Children aged 0-14 years represented 11 % of TB cases in 2022, highlighting the disease's effect on younger populations. Geographically, the South-East Asia Region bears the largest burden, accounting for nearly half (46 %) of all global TB cases in 2022. This regional concentration points to socio-economic, healthcare access, and environmental factors influencing TB transmission. Continued efforts in diagnosis, treatment, and prevention remain critical to controlling and ultimately reducing the global TB burden.

Aim: The main aim of the thesis is to analyze the variation of distribution of the prominent factors such as age and sex in tuberculosis epidemiology

Objectives:

1. To analyse the correlated disease distribution of tuberculosis cases in the Vavuniya district of Sri Lanka based on data from the local Chest Clinic.
2. To examine nationwide tuberculosis incidence data in Sri Lanka to assess the overall disease distribution.
3. To compare the correlated diseases and risk factor distribution of tuberculosis in Belarus using data from the Department of Pulmonology and related specialties and correlate these findings with global TB reports from WHO to identify relapse factors and associated diseases.

Material and Methods. An analysis of patient case findings was collected from Chest clinic of Vavuniya district of Sri Lanka to analyze the district distribution of tuberculosis with correlation to other prevailing diseases, five risk factors and relapse correlations. The nationwide data also collected to analyze the total distribution of the correlated diseases of the TB patients in Sri Lanka. The information regarding the five risk factors, relapse findings and other correlated diseases of TB patients in Belarus was collected from the Department of Pulmonology, Phthisiology, Allergology and occupational pathology with advance training and retraining course. Other supporting factors were clarified from the database submitted to the Global TB report of WHO by the respective.

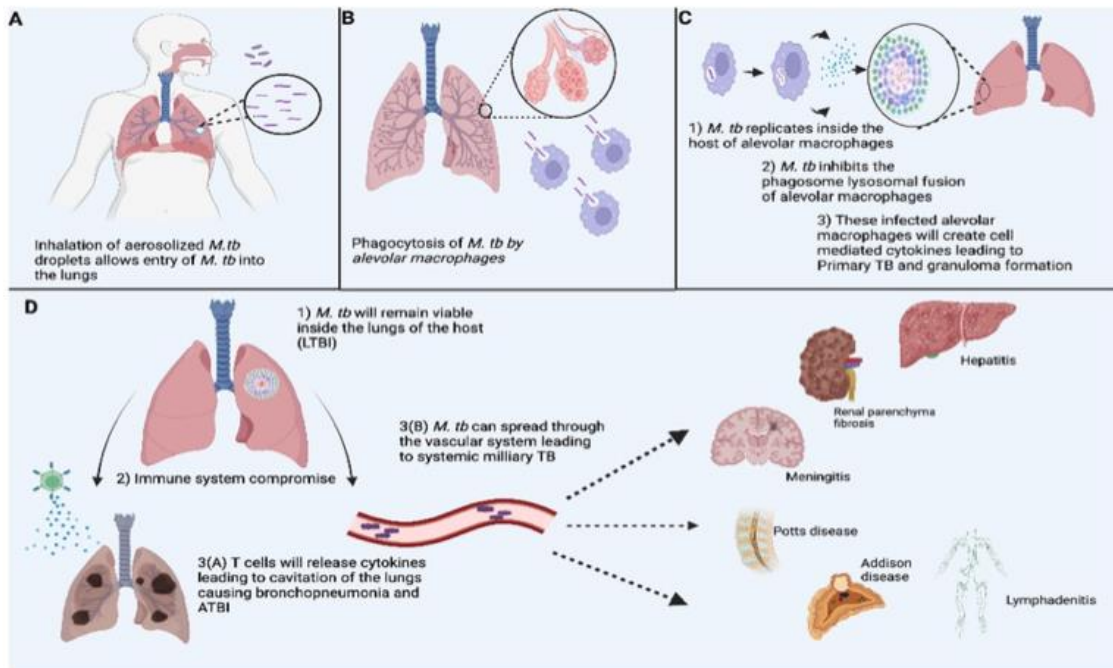


Fig 1: The Scheme of the pathophysiology of Tuberculosis

Results and Discussion. The data collected from the chest clinic department in the Vavuniya district of Sri Lanka highlights a concerning prevalence of various diseases, notably tuberculosis (TB), among patients with comorbid conditions. The study indicates that TB incidence is significantly higher among individuals with type 2 diabetes mellitus, particularly in males, with the most affected age group being 35–75 years, and especially pronounced in those aged 35–45. The findings reveal a greater prevalence of pulmonary tuberculosis (PTB) compared to extrapulmonary tuberculosis (EPTB) across both genders and all associated diseases.

In evaluating risk factors, the study identifies harmful use of alcohol, smoking, diabetes, HIV, and undernutrition as significant contributors to TB cases. Specifically, TB cases attributable to diabetes in Sri Lanka range from 150–1000, contrasting with 29–180 in Belarus, underscoring diabetes as a prominent comorbidity among Sri Lankan TB patients. In Belarus and globally, however, HIV is recognized as a leading correlated disease, accounting for 6.1 % of total TB incidence.

HIV is known to exacerbate the risk of TB progression from latent to active disease due to its immunosuppressive effects, which facilitate the breakdown of granulomas in PTB. Conversely, the relationship between TB and diabetes remains less clear, though it is associated with an increased risk of multidrug-resistant TB. Factors such as body mass index (BMI), hyperglycaemia, and dyslipidaemia may contribute to heightened susceptibility to TB among diabetic patients. This complex interplay of diseases emphasizes the need for targeted interventions and comprehensive management strategies to address the dual burden of TB and its associated comorbidities in Sri Lanka.

Year	Diabetes	CKD	HIV	Cancer
2024	16 (18%)	04 (7%)	-	-
2023	17 (29%)	03 (05%)	01 (02%)	-
2022	24 (45%)	06 (11%)	-	03 (06%)
2021	17 (32%)	06 (11%)	-	02 (04%)

Fig 4: Number of patients who have TB *and* another specific disease (HIV, CKD, Cancer, Diabetes, Hypertension, Heart Disease, Immunodeficiency, Liver Disease)

Conclusion: In majority of the countries the most prominent correlated disease is HIV according to the TB report by WHO but in some third-world countries and under developing countries such as Sri Lanka the Diabetes Mellitus type-2 has seemed to be dominating. To the statistical report it is evident as Type 2 diabetes because of the low prevalence of HIV incidence but diabetes mellitus is being prominent correlated disease to the prevailing TB incidence should be studied to analyse the specific contributing factor to increase the TB incidence and relapse with unspecified influence in immune system.

Literature

1. Ketata W, Rekik WK, Ayadi H, Kammoun S. Les tuberculoses extrapulmonaires [Extrapulmonary tuberculosis]. *Rev Pneumol Clin*. 2015 Apr-Jun;71(2-3):83-92. French. doi: 10.1016/j.pneumo.2014.04.001. Epub 2014 Aug 15. PMID: 25131362.
2. Cardona PJ. Pathogenesis of tuberculosis and other mycobacteriosis. *Enferm Infecc Microbiol Clin (Engl Ed)*. 2018 Jan;36(1):38-46. English, Spanish. doi: 10.1016/j.eimc.2017.10.015. Epub 2017 Dec 2. PMID: 29198784.
3. Schito M, Migliori GB, Fletcher HA, McNerney R, Centis R, D'Ambrosio L, Bates M, Kibiki G, Kapata N, Corrah T, Bomanji J, Vilaplana C, Johnson D, Mwaba P, Maeurer M, Zumla A. Perspectives on Advances in Tuberculosis Diagnostics, Drugs, and Vaccines. *Clin Infect Dis*. 2015 Oct 15;61Suppl 3(Suppl 3):S102-18. doi: 10.1093/cid/civ609. PMID: 26409271; PMCID: PMC4583570.