



One Step toward a Low Tuberculosis-Burden Country: Screening for Tuberculosis Infection among the Immigrants and Refugees

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South Korea is an intermediate tuberculosis (TB) burden country with annual incidence of 65.9 cases per 100,000 population in 2018¹. As the burden of TB decreased, screening and treatment of latent TB infection (LTBI) was initiated, consistent with guidelines of World Health Organization (WHO)². Contact investigation was fully implemented since 2013, and large-scaled LTBI program which included healthcare workers, postnatal care workers, nursery workers, workers in social welfare facilities was also implemented since 2017³.

Immigrants are well-known high-risk group for both LTBI prevalence and progression to TB disease⁴. Among the Organizations for Economic Co-operation and Development (OECD) countries, approximately half of the TB cases occur in foreign-born resident⁵. Many low TB burden countries implemented their own LTBI screening program for immigrants. As the cost-effectiveness of screening immigrants for LTBI, which is the important evidence for implementing a policy, depends on the countries' various epidemiologic status^{4,6}, there is a little difference in the location of screening, selection criteria based on age, countries screened, screening tools for LTBI among

those countries⁷. Moreover, screening program in one country can be modified as the epidemiologic status changes. For instance, in the United States, previous LTBI screening program mainly focused on before or shortly after arrivals. However, as the foreign-born TB patients who arrived US more than 10 years ago outnumbered those who arrived within 10 years in 2015, U.S. Preventive Services Task Force underscored that foreign-born persons from high TB burden countries should be screened for LTBI regardless of time since arrival in the United States^{8,9}. The effect of screening and treatment of LTBI for immigrants were demonstrated in a retrospective cohort study in United Kingdom¹⁰. With average 2.5 years of follow-up, incidence rate of active TB decreased by 83% when immigrants with positive LTBI test were treated.

In South Korea, the number of foreign-born TB patients increased since 2000, which culminated in 2016 with 2,123 new foreign-born cases¹. Until recently, TB screening program for immigrants in South Korea targets only active TB disease, which is composed of pre-arrival screening in nineteen Asian countries with high TB burden, and post-arrival screening at the time of visa extension or modification¹¹. Several pilot studies of screening LTBI among the immigrants were initiated in South Korea since 2018.

Refugees are far more vulnerable group—risk of TB within the 1 year after arrival was double that in regular immigrants¹². Malnutrition, limited access to healthcare, crowded environment of refugee camp, uncontrolled comorbidities such as diabetes mellitus could all raise the risk of TB. In a previous issue of *Tuberculosis & Respiratory Diseases*, Kim et al.¹³ reported a part of LTBI cascade of care for refugees from North Korea. They were young adults with mean age of 35.4, and 96.5% of refugees were household contacts. According to World Health Organization's report, North Korea is one of the 30 high TB burden countries with estimated annual incidence of 513 cases per 100,000 population in 2018¹⁴. Although many parts of the national TB control program of North Korea are

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not well-known, LTBI treatment for contacts aged over five is not widely done in high TB burden country². However, as the risk of TB re-infection is much lower in South Korea, benefit of LTBI treatment is warranted. That's why the immigrants from high TB burden country should undergo screening of LTBI.

In the perspective of LTBI cascade of care, rate of treatment initiation was good enough (172/172, 100%). Completion rate of LTBI treatment was lower (117/172, 68.0%) in North Korean refugees, when compared with South Korean contacts (77/88, 87.5%), but the regimen might be the real cause for such low completion rate. Although the reasons for treatment interruption were not clearly described in this article, transfer-out from Hana medical office to hospitals near new settlement might increase the rate of treatment interruption. In previous studies, transfer-out was an independent risk factors for loss to follow-up in treatment of active TB¹⁵. Presumably, longer regimen (nine months of isoniazid) might be more vulnerable to treatment interruption caused by transfer-out than shorter regimen (4 months of rifampicin). Further qualitative studies on why the refugees from North Korea stop taking LTBI medication would be helpful.

Then what would be the next step? All interventions in public health area have both cost and effect as two sides of a coin. Especially, as the screening and treatment of LTBI is basically a preventive intervention, analysis of cost-effectiveness is essential. For mathematical modeling, which is a tool for cost-effectiveness analysis, various information such as full course of LTBI cascade of care, long-term efficacy of treatment, frequency of major adverse effects is needed. Cohort study may give answers. As TB is a chronic infectious disease, it may take several years of follow-up to see the long-term effect of LTBI screening and treatment.

Since other preventive measures such as TB vaccination are not yet available, screening and treatment of LTBI is a single most effective method with obvious evidence to prevent TB. Indications for LTBI screening can be classified into clinical risk group such as the immunocompromised, population risk group like contacts or immigrants, vulnerable group such as homeless people, and occupational risk group like healthcare workers⁴. Until recently in South Korea, contacts and clinical risk groups have been major target groups for screening and treatment of LTBI. However, for a one step toward low TB burden country, more active strategies targeting those with social risk such as immigrants or refugees are needed. In addition, those strategies should be based on our own evidence, derived from various studies investigating current epidemiologic status of TB in South Korea.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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