



TRANSMISSION OF TUBERCULOSIS AMONG
HOUSEHOLD CONTACTS IN AN AREA WITH
A HIGH PREVALENCE OF HIV INFECTION:
CHIANG RAI, THAILAND

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Title: Transmission of tuberculosis among household contacts in an area with a high prevalence of HIV infection: Chiang Rai, Thailand

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ABSTRACT

Study setting: Chiang Rai province an endemic area of HIV and tuberculosis (TB), Thailand.

Study design: This is a cross-sectional study, carried out on household contact tracing of TB index cases who were a mixture of HIV-positive and HIV-negative.

Objectives: The aims of the study were 1) To determine prevalence and its risk factors of tuberculosis (TB) infection among the household contacts of TB/HIV-positive and TB/HIV-negative patients. 2) To determine prevalence of active tuberculosis and risk factors among the household contacts of TB/HIV-positive and TB/HIV-negative patients.

Methodology: The study was carried out from July 2000 to March 2002. Consecutive consenting new smear-positive adult TB patients were prospectively identified from 3 study hospitals and interviewed. Their

families were visited and investigated within one month of the identification of the TB index case, all household contacts were interviewed on socio-demographic, relationship to the index patient, sharing bedroom with index case, history of health and symptoms related TB. Bacillus Calmette-Guerin (BCG) scar was look for. The household contacts were investigated by physical examination, tuberculin skin test (TST) and mumps skin test. Voluntary HIV testing, chest radiography, sputum smear examinations for TB and culture were added where necessary.

Results: All eligible 221 TB/HIV-positive and 305 TB/HIV-negative index cases agreed to participate. Eighteen HIV-positive and 24 HIV-negative index cases did not have any contacts in the same house. Among 1,300 household contacts identified, 1,248 consented to participant in the study. Of these 1,240 agreed for TST and 930 consented for HIV testing.

Household contacts of HIV-positive index cases were older age and less likely to be hill-tribe, had higher formal education, higher widowhood and higher HIV-positive rate, were less likely to have BCG scar, less likely to share bed or bedroom with index cases, more likely to be a parent or sibling but less likely to be a spouse or child of the index cases, compared with contacts of the HIV-negative.

Prevalence of TB infection (TST induration ≥ 10 mm) among the respective contact groups were 46.5% (247/531) and 62.1% (440/709, crude OR = 0.53, 95%CI 0.41-0.69). The odds ratio became 0.55 (95%CI 0.41-0.75) after adjustment for level of bacilli in the sputum smear of TB index cases, and the following status of contact: age, sex, family relationship, sharing bedroom, care giving to the index case, BCG scar and HIV status.

Forty-seven among 1,248 contacts were identified as having active TB. The prevalence in the two groups were 3.0% (16/534) and 4.3% (31/714, OR=0.68, 95%CI 0.35-1.31, p=0.250), respectively. Significant risk factors for TB included duration of exposure to index cases >120 days, being spouse/child of index case, sharing bedroom with TB patients, having more than 2 persons/bedroom and having body mass index (BMI) of less than 20 kg/m².

Higher HIV prevalence was found among contacts of HIV-positive TB patients than among contacts of HIV-negative TB index cases, 14.3% (59/413) versus 2.5% (13/517); OR = 6.46 (95%CI 3.43-13.02). Spouses of HIV-positive TB cases had a HIV prevalence of 49.4% (41/83). Among the contacts who were HIV-positive 9.7% (7/72) had undetected active TB.

Conclusions: In this study, TB infection rate among household contacts of the TB/HIV-positive patients were lower than that of their HIV-negative counterparts, even after adjustment for characteristics known to affect TB transmission. The prevalence of active TB among household contacts did not statistically differ by HIV status of index cases, but HIV-positive of contacts were related to active TB. Higher HIV prevalence was found among contacts of HIV-positive TB patients than among contacts of HIV-negative TB index cases and spouses of HIV-positive TB cases had the highest HIV prevalence.

Recommendations: Due to high prevalence of both diseases, HIV testing should be carried out on all TB patients. Undetected active TB is not uncommon among the contacts therefore it should be a routine to do contacts tracing in this area.

Spouses of TB index cases with HIV-positive should be investigated for HIV infection under close counseling due to their high risk of HIV/AIDS and consequently on TB infection.

As HIV-positive status of index TB patient dose not independently increase risk of infection or disease for the contact, there is no reason to have a special precaution on these patients.