Use of the T-SPOT.TB assay to screen latent tuberculosis infection among the TB contacts in Shanghai, China

A study that observed a high prevalence of LTBI among the TB contacts in Shanghai, highlighting the need of interventions among the household contacts and those contacting smear-positive TB patients.

Key words
Latent tuberculosis infection, T-SPOT.TB, TB contacts, screening, risk factors

Results
Patients contacting smear positive tuberculosis (TB) were 2.2 times (95% CI, 1.6-3.2) more likely to develop latent tuberculosis infections (LTBI) than those otherwise. Household contact increased the likelihood of LTBI significantly by 1.5 times (95% CI, 1.1-2.2). Among household contacts, the risk of LTBI was higher in spouses and first-degree relatives and increased with age and contact duration.

The percentage of all-cause deaths in the study population was 15% after 2-6 years from the most recent TB diagnosis. TB was responsible for only 17% of all deaths, and for 7.2 potential years of life lost (PYLL). PYLL were higher in females (8.2) than males. After adjustment for sex, age, and treatment history, four factors were significantly and independently associated with increased risk of death: psychopathy, chronic bronchitis, cancer, and the presence of multiple diseases.

Key messages
- There is a high prevalence of latent TB infections among the TB contacts in Shanghai.
- Elderly TB patients with comorbid chronic conditions are at high risk of deaths in urban areas.

Policy considerations
- Plan interventions among the household contacts and those contacting smear positive TB patients.
- Implement improved clinical management, prevention strategies, and other public health programs, which should target TB patients with chronic conditions especially those with multiple diseases.
Rationale of the study

Close contact with TB cases is a major risk factor for Mycobacterium tuberculosis (Mtb) infection and close contacts to TB cases have a higher incidence of TB disease than the general population in the first year after exposure, although the risk may differ across different locations and populations. These differences may be due to the variations in the TB prevalence in the location, population density, socio-economic development, infectiousness of TB patients and the extent of contact.

Accurate detection and adequate treatment of LTBI are fundamental elements needed to reduce the incidence of tuberculosis, particularly in low-incidence areas and among high risk individuals such as contacts of a TB patient.

There is limited information on the prevalence of LTBI and the risk factors among contacts of pulmonary TB, which might contribute significantly to TB burden and therefore become the major concern for TB control in China. The case-fatality rate for TB remains high in China, whereas risk factors for deaths among TB cases are still unclear.

Methods

A total of 45 diagnosed TB patients from each of seven Shanghai districts were chosen and approximately three contacts per case were randomly selected. A structured questionnaire was used to acquire socio-demographic information and to assess the degree of exposure to index cases. The LTBI screening was performed by a T-SPOT.TB assay, which has been proven to be a sensitive, specific, as well as, accurate method for identifying TB infection in TB high-burden countries, and is not confounded by BCG vaccination or the individual’s immune status.

At the same time, a retrospective cohort study of all pulmonary TB patients registered in four districts of Shanghai from 2004 to 2008 was conducted. Data were derived from the China National TB Surveillance System. A total of 4271 patients were followed up in communities.

Selected literature


Correspondence

Weibing Wang, Associate Professor PhD
School of Public Health, Fudan University, Shanghai, China

Biao Xu, Professor MD MPH PhD
School of Public Health, Fudan University, Shanghai, China

EPI-4 is a partner-driven cooperation for intensifying efforts to reach the health-related MDGs in China, India, Indonesia and Vietnam through evidence for policy and implementation (2011-13). It is funded by the Swedish International Development Cooperation Agency (Sida). The project focuses on disadvantaged populations, highlighting the need for greater equity in achievement of the MDGs. In Sweden, Karolinska Institutet, Gothenburg University, Umeå University and Uppsala University are participating. The project partners are Fudan University (China), University of Gadjah Mada (Indonesia), the Public Health Institute of India, and the National Pediatric Hospital of Vietnam.

Research brief created by
Olivia Biermann, MSc
olivia.biermann@ki.se

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