



**Karolinska
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Institutionen för Medicin, Enheten för infektionssjukdomar, Solna

Tuberculosis in Stockholm

studies on transmission, prevention and control

AKADEMISK AVHANDLING

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ABSTRACT

The first priority of tuberculosis control programs is diagnosis and treatment of all individuals with active tuberculosis. Contact tracing constitutes the second priority of tuberculosis prevention and control. Patients' inclinations to cooperate are essential for its results. Treatment of latent infection with *Mycobacterium tuberculosis* effectively reduces future activation and transmission of tuberculosis. However, patient adherence to preventive treatment influences its effectiveness. Early diagnosis and treatment as well as prompt isolation of infectious patients are essential for protection of health-care workers and patients in hospital settings.

We analyzed a nosocomial outbreak of tuberculosis in a hospital ward where the number of cases with active tuberculosis among contacts was unexpectedly high. The outbreak was not revealed until the *Mycobacterium tuberculosis* genotyping results from the first two secondary tuberculosis cases were available. Seven contacts including three health-care workers developed tuberculosis within 10 months after the death of a HIV positive patient from pulmonary tuberculosis. Six out of seven cases were verified by culture and all six *M. tuberculosis* isolates were confirmed by restriction fragment length polymorphism to cluster with the *M. tuberculosis* isolate from the index case. For the health-care workers there was a correlation between number of working hours and risk of acquiring tuberculosis infection and disease. TB outbreaks often originate from clinical mistakes in diagnosing and treating the disease. Spread of a unique, isoniazid resistant strain of *M. tuberculosis* in Stockholm and Sweden resulted in 121 active tuberculosis cases between 1996 and 2012. Several deficiencies in the case-management of patients were identified. Non-adherence was significantly associated with poor outcome, defined as failure, relapse and death. In this thesis we investigated transmission of this cluster and evaluated results of contact tracing performances. Out of 109 cases from Stockholm, 91% were included in this study. In 16 % of infectious index cases, the contact tracing was not executed. Non-adherence to treatment was recorded in 40% of index cases. There was a strong association between not executing contact-tracing and non-adherence of index cases. There were significantly more active TB cases in contacts to non-adherent index cases.

Our results indicate that the cooperation of patients with health personnel regarding performance of contact tracing could be used to predict future non-adherence and TB transmission. In another study we tried to determine factors associated with failure to complete preventive treatment. Association between treatment completion status and patient characteristics was assessed using logistic regression. We found that younger patients, patients originating from Somalia and asylum seekers were more likely to interrupt treatment. The proportion of those who completed treatment increased from 71% in 2002 to 87% in 2007. However, this trend appeared to be caused mostly by an increase in the proportion of European patients. In conclusion, our studies have revealed serious pit-falls in the control of tuberculosis in Stockholm and provide recommendations about how to improve case-management of patients and preventive measures.

Key words: contact tracing, immigrants, health-care workers, adherence