Risk factors for pulmonary tuberculosis in Russia: case-control study
Richard Coker, Martin McKee, Rifat Atun, Boika Dimitrova, Ekaterina Dodonova, Sergei Kuznetsov, Francis Drobniewski

Abstract

Objectives To determine risk factors for pulmonary tuberculosis in Russia.
Design Case-control study of exposure to a variety of risk factors before and during the development of pulmonary tuberculosis.
Setting Large city in Russia.
Participants Cases were 334 consecutive adults diagnosed as having culture confirmed pulmonary tuberculosis between 1 January 2003 and 31 December 2003. Controls were 334 individuals sampled from a validated population registry, matched for age and sex to the patients with tuberculosis. A questionnaire collected information on potential risk factors.
Main outcome measures Risk factors associated with the development of tuberculosis.
Results The main risk factors for tuberculosis were low accumulated wealth (univariate odds ratio 16.70), financial insecurity (3.67), consumption of unpasteurised milk (3.58), diabetes (2.66), living with a relative with tuberculosis (2.94), being unemployed (6.10), living in overcrowded conditions (2.99), illicit drug use (8.74), and a history of incarceration in both pretrial detention centres (5.70) and prison (12.50). Unemployment was also associated with a substantially increased risk (6.10), whereas financial insecurity had less of an effect (1.97 for least secure group). The risk of infection was more than three times higher among those who had drunk raw milk (3.58) and almost three times higher among those who had diabetes (2.66) or who were living with a relative with tuberculosis (2.94).

Discussion

Our findings measure the risks associated with a variety of social factors and tuberculosis. Poverty, unemployment, drinking unpasteurised milk, diabetes, living with a relative with tuberculosis, living in overcrowded conditions, and a prison or detention history were independently associated with an increased risk of tuberculosis.
Research has shown that a history of imprisonment is strongly associated with tuberculosis but did not examine the role of pretrial detention centres, unpasteurised milk, or diabetes. Others have drawn attention to the role of the criminal justice system, specifically pretrial detention centres, in the epidemic of tuberculosis in Russia but did not measure this association. Our study confirms that incarceration is associated with a substantial increase in the risk of pulmonary tuberculosis. However, the small size of the population attributable risks associated with the two forms of incarceration suggest that, contrary to common belief, imprisonment—before trial or after sentencing—does not contribute greatly to the overall burden of tuberculosis in Russia.

The association found with unpasteurised milk may be linked to *Mycobacterium bovis* infection. The dairy industry has been affected by the political transition, and the consumption of unpasteurised milk has increased. If the association between drinking raw milk and tuberculosis proves to be related to *M. bovis*, ensuring a safe milk supply would be a public health priority.

Our study has several limitations. Although living with a relative who had tuberculosis was associated with a greater risk, recall...
bias is possible. We did not investigate the potential role of HIV because of ethical, political, and practical considerations. Although HIV infection may be an important but unexplored risk factor, this is a recent phenomenon, and as yet the degree of immune suppression in infected individuals is not marked.

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