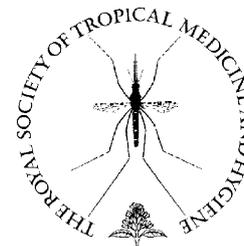




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MINI-REVIEW

The burden of tuberculosis in indigenous peoples in Amazonia, Brazil

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Summary Tuberculosis (TB) stands out as one of the principal infectious diseases affecting Amazonian Indians. Recent research indicates that incidence rates among indigenous peoples may be as much as ten times higher than those of the general Brazilian population. Purified protein derivative reactivity in Amazonia is low compared with populations of European descent; anergy rates usually surpass 50%, even under high BCG coverage. An annual risk of infection of 1.2–2.2% points to high rates of transmission. Whether or not particular susceptibility to TB is linked to genetics, Amazonian Indians face a disproportionately high risk of contracting and dying from TB.

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Tuberculosis (TB) is important among indigenous peoples in the Brazilian Amazon, not only because of its historical role in regional depopulation, but because it is still widespread. Although health statistics available for indigenous peoples in Brazil are limited in coverage and quality, they allow us to reach some conclusions regarding the regional epidemiology of TB. Recent research carried out in different ethnic groups in Amazonia indicates that incidence rates among indigenous peoples may be as much as ten times higher than those of the general Brazilian population. These analyses provide convincing evidence that indigenous peoples in Amazonia are particularly vulnerable to TB, suffering a greater risk of acquiring and dying from TB than non-Indians. Recent findings also point to the deficient quality and coverage of health services made available to indigenous peoples in the country (Basta et al., 2006b; Sousa et al., 1997).

In the general Brazilian population TB incidence may be higher than 70 cases per 100 000 in some municipalities. Among the Suruí, whose TB incidence rates are in the top five

among indigenous groups in Brazil, the average incidence in the period 1991–2002 was nearly 2500 per 100 000, almost 50 times higher than the regional average, with about half the cases diagnosed in children <15 years old. A comprehensive TB cross-sectional survey carried out in this population revealed a prevalence of active TB of 815.2 per 100 000 (Basta et al., 2006b, 2006c). *Mycobacterium tuberculosis* (MTB) isolates from sputum samples obtained during this survey, the first study of MTB transmission by genotyping in southern Amazonia, yielded significant results. Molecular analysis identified four distinct genotypes, one of which proved resistant to standard drugs; this was the first case of drug resistance reported in an indigenous patient in Brazil (Basta et al., 2006c). Another interesting result was the identification of a high proportion (12.8%) of mycobacteria other than tuberculosis (MOTT). Curiously, this finding does not indicate TB/HIV co-infection, as is the general case in urban Brazil. Previous work carried out in the extreme north of the region, among the Yanomami Indians, identified two genotypes (Sousa et al., 1997).

Studies of TB immunology of indigenous peoples have stressed the characteristics of purified protein derivative (PPD) skin test reactivity. All such studies have reported

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that PPD reactivity in Amazonian Indians is low compared with populations of European descent. Anergy rates are high, usually over 50% of subjects tested, even in populations with relatively high BCG coverage (Escobar et al., 2004; Sousa et al., 1997).

Given the high incidence rates of TB combined with PPD reactivity less than expected, some authors suggest that an explanation for the enhanced susceptibility to infection and disease observed in Amazonian Indians might be found in still unclear immunological mechanisms underlying the reported diminished cell-mediated immune response against MTB (Basta et al., 2006b; Sousa et al., 1997).

A tuberculin survey estimating the annual risk of TB infection (ARI) among the Suruí Indians revealed a high rate of MTB transmission (ARI 1.2–2.2%). This ARI is much higher than reported in other studies carried out in urban Brazil with the same methodology. The results from the cross-sectional survey, together with the tuberculin survey, demonstrate the heavy burden of TB in the Suruí population (Basta et al., 2006a, 2006b). Moreover, they make clear that, whether or not any particular susceptibility to MTB may be linked to their genetic makeup, indigenous peoples face a disproportionately high risk of contracting and dying from TB.

The Suruí case study, probably the most comprehensive investigation of TB among an indigenous population in Amazonia, contributes to a better understanding of the overall epidemiologic picture in these populations. The epidemiology of TB in the Suruí, however, must be understood in light of the socio-economic conditions that perpetuate health disparities between indigenous peoples and mainstream Brazilian society. Poverty is far from being peculiar to the Suruí; rather it is the common condition of indigenous peoples in the region, where rapid sociocultural change, food insecurity, high prevalence of undernutrition and general deficiencies in health services create the favorable scenario for TB to thrive.

We have only touched the surface of a broad, complex and multifaceted epidemiological picture. Any possible discussion about health–disease processes among indigenous peoples in Amazonia must take into consideration their

enormous social diversity as well as the dynamics of their epidemiology and demography. There are approximately 220 different ethnic groups in Brazil (totaling some 450 000 individuals), 60% of which live in the Amazon. A few groups are still relatively isolated, but a significant number live in urban areas. Although we do not have the quantitative information on which to base a broad and detailed epidemiological analysis, there can be little doubt that the health conditions of indigenous peoples in Brazil are precarious, placing them at a serious disadvantage compared with other segments of the national society.

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