

Is there an association between TB infection and Atopy in Children? A prospective cohort of children 0 - 15 years in Cape Town, South Africa

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Background:

Mycobacterium tuberculosis (M.tb) infection is thought to cause modification of the immune system with resulting inhibition of atopic symptoms. This could lead to the development of a mycobacterial based vaccine to protect against atopy.

Objective: To measure the association between M.tb infection and reported atopic symptoms in children in a high-burden tuberculosis setting.

Methods: 1093 children aged 3 months to 15 years living in Cape Town were prospectively investigated through household contact tracing for *M.tb* infection with tuberculin skin testing (TST) and Quantiferon at enrolment, month 3 and 15. Parental reported atopy symptoms were evaluated at 3 and 6 months using a questionnaire based on the standardized International Study of Asthma and Allergies in Childhood questionnaire, prior to TST and Quantiferon testing.

Results: An inverse association was found overall, between TST positive status (TST+) at enrolment, and reported wheeze at 3 months (OR 0.60, 95% CI 0.40-0.88) and at 6 months (OR 0.55, 95% CI 0.35-0.85), and eczema at 3 (OR 0.42, 95% CI 0.21-0.80) and 6 months (OR 0.51, 95% CI 0.27-0.99) in univariable analysis. TST+ at month 3 and reported hay fever at month 3 were also inversely related (OR 0.43, 95% CI 0.20-0.93). An inverse association was found between a positive Quantiferon at enrolment and reported hay fever (OR 0.51, 95% CI 0.26-0.99) and eczema (OR 0.39, 95% CI 0.20-0.76) at 3 months. In multivariable analysis, baseline TST+ was inversely associated with reported wheeze at 6 months, controlling for age, ethnicity, HIV infection and prior tuberculosis (aOR 0.55, 95% CI 0.35-0.85).

Conclusion: We demonstrate a robust inverse association between *M.tb* infection and reported atopic symptoms in South African children in a cohort study.