Study compares tuberculosis infection and disease progression rates in a prospective manner

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Mycobacterium tuberculosis, the bacteria that causes tuberculosis (TB), is distinct from most germs in its capacity to silently infect individuals

for months and even years before waking up and causing active disease that can lead to severe illness and death. The immune system plays an important role in controlling the germ and keeping it dormant.

Decades of epidemiological data have linked undernutrition to TB. While undernourished individuals have blunted immune systems, a phenomenon which has been dubbed nutritionally acquired immune deficiency (N-AIDS), it is not clear why undernourished individuals are at increased risk of TB disease.

In a new study that followed household contacts (family members/people who share the same dwelling) of persons with TB, researchers have found that undernourished household contacts were three times more likely to progress to TB disease. The study did not find that undernourished contacts were at increased risk of testing positive for TB infection as compared to well-nourished individuals.

The work appears in *Clinical Infectious Diseases*.

"Are they more likely to become infected with the TB germ? Or are their immune systems unable to contain the germ resulting in severe disease? This fundamental question is important to answer as it can guide how we can best protect undernourished individuals who form a key and vulnerable population in the fight against TB," explained corresponding author Pranay Sinha, MD, assistant professor of medicine at Boston University Chobanian & Avedisian School of Medicine.

The researchers, including investigators from both U.S. and Indian institutions (which are part of the Regional Prospective Observational Research for Tuberculosis [RePORT] India consortium), identified nearly 900 household contacts of persons who were newly diagnosed with TB, screening them to make sure they did not have TB disease at enrollment.

They then followed these contacts for up to four years to see if they developed TB disease. Those who had a negative TB infection test at enrollment were retested to see if it had turned positive. The researchers then compared the rate of TB disease and TB infection between undernourished household contacts and well-nourished household contacts.

According to the researchers, these findings have clinical implications.

"We now have greater insight into the mechanism by which undernutrition leads to greater TB risk. It is not by increasing infection, instead, it is by failing to contain the infection when it happens. Fortunately, undernutrition is a modifiable risk factor. Our findings should prompt TB programs to promptly provide adequate rations for the entire household to prevent TB disease among household contacts in addition to TB preventive therapy," adds Sinha.

More information: Undernourished household contacts are at increased risk of TB disease, but not TB infection– a multicenter prospective cohort analysis, *Clinical Infectious Diseases* (2024).

Provided by Boston University School of Medicine

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