

## Persistently high HIV seroprevalence among adult tuberculosis patients at a tertiary care centre in Delhi

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**Background & objectives:** This study was designed to estimate HIV seroprevalence among tuberculosis patients presenting to tertiary care centre in Delhi.

**Methods:** Cross-sectional prevalence study among all patients presenting to the inpatient and outpatient departments of All India Institute of Medical Sciences (AIIMS), New Delhi, and receiving anti-tuberculosis treatment from May 2003 to April 2005.

**Results:** Of the 448 patients who presented to the TB clinic during the study period, 23 (5.1%) were previously tested HIV-positive. An additional 21 patients (4.6%) refused testing, and 30 (6.7%) were lost to follow up. Of the remaining 374 patients who consented to testing, 31 (8.3%) were found to be HIV-positive. Risk factors for HIV seropositivity included high-risk sexual behaviours (48% in HIV-TB co-infected vs. 6% in TB infected patients,  $P<0.001$ ) and history of blood transfusion (23% vs. 5%;  $P=0.002$ ).

**Interpretation & conclusion:** Previous studies from the same hospital published in 2000 and 2003 reported HIV seroprevalence among TB patients to be 0.4 and 9.4 per cent respectively. The current study documents a persistently high seropositivity among TB patients. These results emphasize the acute need for improved detection and treatment for HIV among TB patients in northern India.

**Key words** HIV - HIV-TB co-infection - HIV testing - India - seroprevalence - tuberculosis

Tuberculosis (TB) and HIV epidemics are heavily intertwined, each increasing the morbidity and mortality of the other. In India, there are over three million annual prevalent active TB cases and over five million HIV-positive individuals. Although the country-wide prevalence remains less than 1 per

cent (0.91%),<sup>1</sup> a vast majority of HIV-positive patients do not know their status; less than 5 per cent of the approximately 770,000 patients in need of antiretroviral therapy currently have access to it<sup>2</sup>. Strategies to detect and treat HIV are thus of a pressing concern. Given that TB is the most common

opportunistic infection in HIV infected individuals in India<sup>3,4</sup>, detecting HIV among TB patients presenting to the health sector represents an important public health opportunity. Programmatic planning requires the availability of up-to-date data on HIV seroprevalence among different populations of TB patients.

Data from several sources suggest a high burden of HIV among TB patients in India. Overall, WHO has reported an HIV seroprevalence of 5.2 per cent among adult TB patients in India for the year 2002<sup>5</sup>. Other data suggest that these rates are not only high, but increasing. For example, in Pune, Maharashtra, HIV seroprevalence among TB patients increased from 10 per cent in 1995 to 28.75 per cent in 2000<sup>6</sup>. A similar survey done at Pennathur sanatorium, Tamil Nadu, had documented a rise from 2 per cent in 1992-93 to 9.4 per cent in 1997-98<sup>7</sup>. This trend has been observed in rural pockets of Thanjavur, Tamil Nadu as well<sup>8</sup>. Recently published sentinel surveillance report by National AIDS Control Organization (NACO) shows an alarming HIV seroprevalence of 9.0 per cent amongst TB patients from four districts, each one in high prevalence State<sup>1</sup>.

Data from northern India are sparse. Apart from Delhi, parallel sentinel surveillance data are not available for States with low HIV seroprevalence<sup>9</sup>. Previous work at our institution has shown a dramatic increase in HIV seroprevalence (from 0.4 to 9.4%) among patients with TB presenting to the outpatient medicine department and inpatient wards of the All India Institute of Medical Sciences (AIIMS) hospital in New Delhi from 1994-1995 to 2000-2002<sup>10,11</sup>. Recently, data published from Agra, Uttar Pradesh, showed HIV seroprevalence of 4.3 per cent amongst TB patients<sup>12</sup>. Given such an alarming rise in seroprevalence rates, this study was planned to continue to monitor HIV seroprevalence among TB patients followed at the outpatient department or admitted to the wards of the AIIMS hospital from May 2003 to April 2005.

## Material & Methods

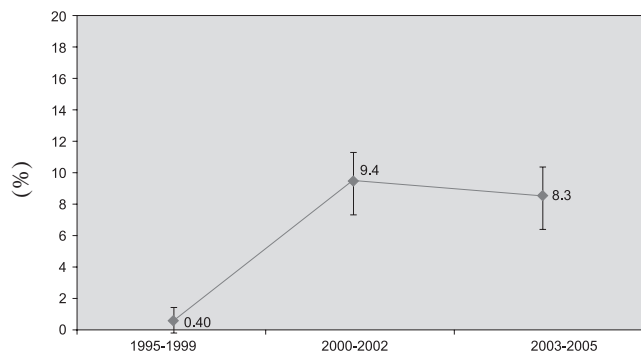
We performed a cross-sectional study of HIV seroprevalence among 448 consecutive TB patients >3 yr of age being started on anti-tuberculosis treatment (ATT) at AIIMS, New Delhi during May 2003 and April 2005. Some of these patients might have received treatment from outside clinics or hospitals prior to coming to AIIMS; thus both new and retreatment cases were included. Owing to the complexity of TB diagnosis and the aims of the study to assess those patients interacting with the health system for the purposes of treatment, no other diagnostic criteria were specified. The patients were counselled before and after being tested for HIV. For those patients who tested positive for HIV, further work-up and management were done (data not shown). Written informed consent was obtained from all patients. The study received approval from the ethical review committee of AIIMS.

*HIV serology:* Peripheral venous blood samples were tested for the presence of antibodies against HIV-1 and -2 by two different enzyme immunoassays (HI-Chex, Xcyton Diagnostics, Bangalore, India and Biotest anti HIV tetra ELISA, Biotest AG, Germany). Samples testing positive on both immunoassays were recorded as HIV-positive. Discordant results were repeated, which subsequently resolved any prior inconsistencies.

*Statistical analysis:* Data were analyzed using the SPSS 10.0 statistical package (SPSS Inc., USA).

## Results

Four hundred forty eight patients with TB attending the outpatient medical clinic and inpatient wards at the AIIMS hospital were screened for inclusion in the study. Twenty three TB (5.1%) patients were known HIV-positive and were excluded from the study. Twenty one patients (4.6%) refused testing. The main reasons for refusal were perceived absence of risk factors or apprehensiveness in front of family members. Thirty patients (6.7%) were lost to follow up after the screening



**Fig.** HIV seroprevalence (with 95% confidence interval) among TB patients at AIIMS (1995-2005).

interview. HIV test was done in 374 TB patients who consented; out of these, 31 (8.3%) were found to be HIV-positive. This figure was chosen as the best estimate of HIV seroprevalence in our population (8.3%, 95% CI: 5.4 to 11.21).

Of the 374 patients, 224 (59.9 %) were residents of Delhi, and the remaining were from the neighboring States such as Uttar Pradesh, Haryana, and Bihar. Possible risk factors for HIV were promiscuity (48% in HIV-TB co-infected vs. 6% in only TB patients;  $P < 0.001$ ) and history of blood transfusion (23% in HIV-TB co-infected vs. 5% in only TB patients;  $P = 0.002$ ). Statistically significant difference was observed in the proportion of truck drivers (32 vs. 4%;  $P < 0.001$ ) and farmers (19 vs. 7%;  $P = 0.003$ ) present in HIV-TB co-infected and only TB patients.

Fig. provides approximate 95 per cent confidence limits for point estimates of prevalence from each of the studies from AIIMS; the current estimate and that from 2000-2002 estimates did not reach statistical significance.

### Discussion

This study demonstrated that the HIV seroprevalence among TB patients presenting to the outpatient medical clinic or the inpatient wards of the AIIMS hospital from 2003-2005 was 8.3 per cent, as compared to previous reports of 0.4 per cent in

1995-99<sup>10</sup> and 9.4 per cent in 2000-2002<sup>11</sup> in the same settings. These data suggest that the rate of HIV positivity continues to be high and possibly increasing among TB cases at AIIMS. The persistently high HIV seroprevalence in this patient population is of concern both in terms of patient management and public health perspective. Similar study from northern India reported HIV seroprevalence of 4.3 per cent among TB patients<sup>12</sup>. Low prevalence (0.4%) during 1995-1999 was probably due to infancy of the potential devastating HIV epidemic and also because it initially started from the southern part of India. Higher rates of 9.4 and 8.3 per cent observed over the subsequent years represent the rapidity with which the epidemic has spread in the whole of country. The trend observed over the years highlights the importance of continuous surveillance and in-time appropriate preventive measures.

There are several potential limitations of this study. A strong bias in the study population as it is from a tertiary care referral centre and that this particular population could have had a greater prevalence of HIV than among TB patients generally in northern India. Additionally, the patients in the study were selected on the basis of receiving ATT from treating clinicians at AIIMS, a criterion which may only partially reflect underlying TB disease. The reason for selecting these patients as such was to provide estimates among patients interacting with the health system for the purposes of ATT, which is probably the most important patient population from a public health programming perspective. The generalizability of the results is lessened by variability in diagnostics and treatment practices at different clinics in India. In the absence of a simple test for the diagnosis of active TB, keeping in view the varied clinical presentation, this approach is reasonable. Despite these limitations, the high HIV seroprevalence in this population is a cause for alarm and a call to action in combating these twin epidemics.

Knowledge of HIV status in a TB patient is critical from both patient and public health perspectives. In

those patients who test seropositive for HIV, better care can be provided in the form of effective combined ATT and antiretroviral treatment. If an HIV-positive TB patient on ATT worsens or fails to improve with therapy, the possibility of other co-existing opportunistic infections or immune reconstitution syndrome should be considered. Knowledge of a person's HIV serostatus also provides the opportunity to administer prophylaxis for opportunistic infections and thereby reduces morbidity and mortality. The spouse and relatives of HIV seropositive patients may also be counselled on HIV infection and its modes of transmission and prognosis, preventing the spread of infection. Spouses may be educated on safe sex practices and may be offered testing themselves.

Currently, the recommendation from WHO is for continued surveillance in low prevalence areas with HIV infection among TB patients<sup>13</sup>. It is likely that voluntary counselling and testing (VCT) alone may not be sufficient in increasing HIV testing among TB patients in India, and a routine approach is necessary. Data from modeling from USA have suggested that a HIV seroprevalence even on the order of 1 per cent among TB patients would indicate that routine HIV screening among these patients is cost-effective<sup>14</sup>.

In conclusion, there is a pressing need for the Revised National Tuberculosis Control Programme (RNTCP) and NACO to collaborate on feasibility of making HIV counselling and testing routinely available to all DOTS and other TB patients throughout India.

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