HIV/TB CO-INFECTION: PERSPECTIVES OF TB
PATIENTS AND PROVIDERS ON THE INTEGRATED
HIV/TB PILOT PROGRAM IN TAMILNADU, INDIA

by

Mahalakshmi Lakshminarayanan

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OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PUBLIC HEALTH

In the
Faculty of Health Sciences

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SUMMER 2009

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STUDENT'S NAME : Mahalakshmi Lakshminarayanan

DEGREE: MASTER OF PUBLIC HEALTH

THESIS TITLE: HIV/TB CO-INFECTION: PERSPECTIVES OF TB PATIENTS AND PROVIDERS ON THE INTEGRATED HIV/TB PILOT PROGRAM IN TAMILNADU, INDIA

Chair Of Defense: Dr. Mark Lechner
Senior Lecturer
Faculty of Health Sciences

Senior Supervisor: Dr. Arun Chockalingam
Professor
Faculty of Health Sciences

Supervisor: Dr. Michel Joffres
Professor
Faculty of Health Sciences

External: Dr. Steve Corber
Associate Professor
Faculty of Health Sciences

Date Defended / Approved: July 20, 2009
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ABSTRACT

The WHO recommends routine HIV testing among TB patients as a key strategy to combat the dual HIV/TB epidemic. India has integrated its HIV and TB control programs and is offering provider initiated HIV testing for all TB patients since 2007. Using a mixed methods approach, this study aims to understand the perspectives of TB patients and providers on the integrated HIV/TB pilot program in Tamilnadu, India. A survey conducted by the Tuberculosis Research Center, India on 300 TB patients is the source for quantitative data and in-depth interviews conducted by the researcher with ten health care providers constitute the qualitative data. Findings of this study show that HIV testing among TB patients is feasible and acceptable in this setting. However, as identified by the providers, barriers like social stigma for HIV/AIDS and lack of adequate counseling services exist, which when addressed appropriately, could maximize uptake of the continuing program.

Keywords: HIV/TB co-infection; TB patients; health care providers; integrated HIV/TB pilot program, India

Subject terms: HIV/TB co-infection; integrated HIV/TB services; provider initiated HIV testing and counseling; developing countries
Acknowledgements

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LIST OF ABBREVIATIONS

AIDS- Acquired Immunodeficiency Syndrome
ANC- Antenatal Clinic
ART- Antiretroviral Therapy
ATT- Anti-Tuberculosis Treatment
CDC- Center for Disease Control
DOTS-Directly Observed Treatment Shortcourse
GDP-Gross Domestic Product
HIV- Human Immunodeficiency Virus
ICMR- Indian Council of Medical Research
ICTC- Integrated Counseling and Testing Center
IDU-Injection Drug User
NACO- National AIDS Control Organization
PHC-Primary Health Care Center
PITC- Provider Initiated HIV Testing and Counseling
RNTCP-Revised National TB Control Program
SPSS- Statistical Package for the Social Sciences
TB-Tuberculosis
TRC- Tuberculosis Research Center
UNAIDS-Joint United Nations Program on HIV/AIDS
VCT- Voluntary Counseling and Testing
WHO-World Health Organization
INTRODUCTION

The dual epidemics of tuberculosis (TB) and human immunodeficiency virus (HIV) are closely related with each disease influencing the epidemiology, natural history, clinical presentation and treatment outcomes of the other (CDC 1998). HIV is fuelling the TB epidemic in many countries of the world, especially in sub-Saharan Africa and increasingly in Asia and South America (WHO 2004). Similarly, TB is undermining the efforts of HIV prevention and control programs in the developing countries by increasing morbidity and mortality in people living with HIV/AIDS (Raviglione 1992).

There exists a positive synergistic relationship between HIV and TB infections. HIV is the most potent risk factor for reactivation of latent TB infection, progression of new infection and re-infection to active TB disease and spread of drug resistant TB strains in the community (Goldfeld and Ellner 2007). The life time risk of developing TB in immune-competent individuals is 5% to 10% but in people living with HIV/AIDS the risk of developing active TB disease is 60% (WHO 2003). HIV status also influences treatment outcomes in TB patients. HIV positive individuals are at increased risk of developing drug resistant TB strains.

Similarly, TB accelerates the course of HIV disease by increasing HIV-RNA viral loads in co-infected individuals (Garrait et al 1997). In fact, the onset of TB, often in a site outside the lungs, could be the first indication of underlying HIV disease in people who are otherwise unaware of their HIV status. TB is also the leading cause of mortality in HIV infected individuals. The close interaction between the pathogens causing HIV/AIDS and TB is depicted in Figure 1.
Mycobacterium tuberculosis, which is the causative agent for TB, increases HIV viral loads in co-infected individuals through the release of immune mediators like interleukin-1, interleukin-6 and tumor necrosis factor (Nakata et al 1997). High HIV viral loads cause immune-suppression and predispose HIV infected individuals to opportunistic infections like TB. Therefore, PLWHA are at a higher risk of developing active TB disease than HIV negative individuals. Thus, HIV and TB infections are closely related with each disease pathogen facilitating the progression of the other.
BACKGROUND AND LITERATURE REVIEW

Resource implications in developing countries

In many developing countries with high HIV prevalence, HIV/TB co-infection is a major public health problem. With the lack of adequate resources and double burden of both communicable and non-communicable diseases, the actual funds available from national governments for HIV and TB control programs are rather limited in several of these countries. For example, in India the total expenditure on health as percentage of gross domestic product (GDP) in 2006 was 4.9% (WHO Statistics 2008) of which public spending on health was only 0.9% (WHO 2007). In several other developing countries too, public health care expenditure is low and often inadequate to meet the basic health needs of the people. Lack of adequate resources is a major constraint to public health programs in low and middle income countries that also bear the brunt of the global burden of communicable diseases including HIV/AIDS and TB.

Global epidemiology of HIV/TB co-infection

According to the WHO (2009c), one third of the 33.2 million people living with HIV/AIDS world-wide in 2007 were co-infected with Mycobacterium tuberculosis (WHO 2009c). Globally, out of the 9.27 million new cases of TB detected in 2007, approximately 1.37 million (15%) occurred in HIV positive individuals. The African Region accounted for 79% of these HIV positive TB cases and the South-East Asia Region for 11%. In 2007, HIV/TB co-infection accounted for 456,000 deaths globally (WHO 2009a). The estimated HIV prevalence in new adult TB-cases at the end of 2005 is shown in Figure 2.
In the South East Asia Region (SEAR), India, Myanmar, Nepal and Thailand have been identified by the WHO as high TB/HIV burden countries. According to SEARO (2008), “The prevalence of TB among people living with HIV/AIDS has been estimated at 5.2% in India, 7.1% in Myanmar, 3.1% in Nepal and 7.6% in Thailand. The HIV epidemic has reached a generalized stage in Thailand, Myanmar and in six states in India. Concentrated HIV epidemics are being reported from Indonesia, Nepal, Bangladesh (among IDUs) and in some states in India” (pg 7). The increasing prevalence of HIV/AIDS and HIV/TB co-infection is of public health concern to several countries in this region.
Prevalence of HIV/AIDS and TB in India

In India, according to the National AIDS Control Organization (NACO), 2.31 million (1.8-2.9 million) people were living with HIV/AIDS in 2007. The estimated HIV prevalence rate in the population aged between 15-49 years is 0.34% (NACO 2008). Though this prevalence rate is relatively low, due to its large population size, India ranks next only to South Africa and Nigeria in terms of absolute numbers of people living with HIV/AIDS (UNAIDS 2008).

The HIV epidemic in India is highly heterogeneous and is largely concentrated in six states- Tamilnadu, Maharashtra, Andhra Pradesh, Karnataka, Manipur, and Nagaland. Figure 3 depicts the states with high HIV prevalence rates in India.

Figure 3: Map showing states with high HIV prevalence rates in India

Source: National AIDS Control Organization 2006
The NACO has categorized the districts of India based on their HIV prevalence rates (figure 4). 156 districts in the country have been identified as high (HIV prevalence more than 1% among ANC attendees) prevalence areas and fall under category A (high priority districts). Tiruchirapalli district in Tamilnadu is a category A district and has a HIV prevalence of 2.5% among the ANC attendees.

Figure 4: Categorization of districts according to HIV prevalence in India

<table>
<thead>
<tr>
<th>Category of Districts</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>More than 2% ANC/PPTCT prevalence in any time in any of the sites in the last 3 years</td>
</tr>
<tr>
<td>B</td>
<td>Less than 1% ANC/PPTCT prevalence in all the sites during last 3 years Associated with More than 5% prevalence in any HRG group (STI/CSW/MSM/IDU)</td>
</tr>
<tr>
<td>C</td>
<td>Less than 1% in ANC prevalence and Less than 5% in all STD clinic attendees of any HRG with known HIV status (Migrants, Translators, larger aggregation of Factory workers, Tourist etc)</td>
</tr>
<tr>
<td>D</td>
<td>Less than 1% in ANC prevalence in all sites during last 3 years with Less than 5% in all STD clinic attendees on any HRG OR No or Poor HIV Data With Unknown HIV Status</td>
</tr>
</tbody>
</table>

India is also home to the largest number of TB patients in the world and accounts for one-fifth of the global TB incident cases. 40% of the adult Indian population is infected with Mycobacterium tuberculosis. It is estimated that nearly 2 million people develop TB in India each year, of which 0.87 million are sputum positive (WHO 2009b). In 2007, the prevalence rate of TB was 283/100,000 and the annual incidence rate was 168/100,000 (WHO 2009a).
RATIONALE FOR INTEGRATING HIV AND TB CONTROL PROGRAMS

Despite the synergistic interaction between HIV/AIDS and TB infections, public health efforts to control both these diseases have been largely separate in many countries world-wide (WHO 2002). According to a statement released by the WHO (2004), “Rather than pursuing a dual strategy for a dual epidemic, AIDS and TB control programs should identify mechanisms and areas for collaboration to decrease the burden of TB among people with HIV/AIDS and the burden of HIV in TB patients ” (pg 7). This suggests that an integrated approach to tackle HIV/TB co-infection is necessary for reducing the mortality and morbidity caused by both these infections. As there is significant overlap between TB and HIV infections, the WHO recommends that national HIV control programs tackle the problem of TB in people living with HIV/AIDS and TB control programs identify HIV infected TB patients early in order to reduce the burden of HIV in TB patients (WHO 2007).

Provider initiated HIV testing and counseling for TB patients

Until recently, client initiated testing and counseling- also known as voluntary counseling and testing (VCT) had been the primary model for providing HIV testing and counseling. VCT, as the name suggests, involves clients self-presenting for testing at their local HIV testing centers, if they believe they have been exposed to HIV. However, according to the WHO, the uptake of VCT has been limited in the developing countries due to low coverage of services, stigma for HIV/AIDS and the perception by many people, even in high prevalence areas, that they are not at risk (WHO 2007). The WHO estimates that more than 90% of people living with HIV/AIDS in low and middle income countries are not aware of their HIV status (WHO 2006b).
To expand HIV prevention, treatment and care in developing countries, the WHO recommends provider initiated HIV testing and counseling (PITC) for “all patients, irrespective of epidemic setting, whose clinical presentation might result from underlying HIV infection” (WHO 2007 pg.5). PITC involves the health care provider specifically recommending an HIV test to patients attending health facilities unless they “opt-out” of it. As TB is one of the commonest opportunistic infection in PLWHA, the WHO recommends PITC for all TB patients, irrespective of the epidemiologic setting (WHO 2007).

In India, VCT has helped millions of people know their HIV status. However, there are still many HIV positive TB patients who are unaware of their HIV status. According to Piramanayagam et al (2007) “It is likely that voluntary counseling and testing (VCT) alone may not be sufficient in increasing HIV testing among TB patients in India, and a routine approach is necessary” (pg 166).

In keeping with the WHO policy, provider initiated HIV testing of TB patients was introduced in India in 2007, in the states with high HIV burden. However, there is little data available in the country regarding perspectives of TB patients and providers on the integrated HIV/TB services. The purpose of this paper is to determine the feasibility and acceptability of provider initiated HIV testing in TB patients under routine care conditions and to study the perspectives of TB patients and health care providers about the integrated HIV/TB program.
MATERIALS AND METHODS

Study setting

Tamilnadu is one of the four states in South India and is comprised of 30 districts. Tiruchirapalli, also known as Trichy, is the fourth largest city in Tamilnadu, India. The estimated population of Tiruchirapalli district is 2.4 million. It has been classified by NACO as a high HIV prevalence district. The HIV prevalence rate in antenatal clinic (ANC) attendees in this district is 2.5%. Figure 5 shows the HIV prevalence rates in the various districts of Tamilnadu.

Figure 5: Map showing HIV prevalence rates in Tamilnadu,

Source: National AIDS Control Organization 2007
TB care and management in Tiruchirapalli, like the rest of India is decentralized. Patients diagnosed to have TB (all forms) are initiated on treatment under Directly Observed Treatment Shortcourse (DOTS) through the Revised National TB Control Program (RNTCP). TB patients can avail free anti-TB treatment (ATT) from primary health care centers (PHC), designated microscopy centers (DMC), TB units (TU) and government hospitals.

There are six TB units in this district with each unit serving approximately 500,000 people. There are 24 designated microscopy centers, 89 primary health care centers, 29 integrated testing and counseling centers (ICTCs) where HIV testing and counseling is done and one ART center in Tiruchirapalli.

HIV/AIDS treatment in Tiruchirapalli is at present centralized with ART available at only one hospital – Annal Gandhi Memorial Government Hospital. The ICTC are located within district hospitals or near the designated microscopy centers. TB patients are referred to the nearest ICTC to be counseled and tested for HIV/AIDS, as it is not done at the TB treatment centers. Rapid HIV test kits are used routinely for HIV testing at the ICTC and the test results are made known to the patients the same day or the next working day.

Prior to the start of this program, HIV testing of TB patients was done at the ICTC at client’s request or with health care provider’s referral of patients with high risk behavior (“selective referral”). With the introduction of this study, all TB patients were referred for HIV testing to the nearest ICTC as a routine, where pre-test information, informed consent and post-test counseling were given. Those TB patients testing HIV
positive were referred to the ART center at Annal Gandhi Memorial Government Hospital.

**Study design**

Mixed methods study. The data for this study was obtained during my practicum training period in India from May 2008 to July 2008. Initially, I analyzed the quantitative data that was available at the Tuberculosis Research Center (TRC), Chennai, India to understand TB patients’ perspectives on the integrated HIV/TB pilot program. Then, I visited the study setting- Tiruchirapalli to interview health care providers on their views about the pilot program.

**Data collection methods**

**Quantitative data: Secondary data from Tuberculosis Research Center, India**

The Tuberculosis Research Center (TRC), Chennai, India which is affiliated to the Indian Council of Medical Research (ICMR), conducted a pilot study (figure 6) in Tiruchirapalli, to determine the effectiveness of PITC as an intervention for reducing the burden of HIV/AIDS in TB patients. The study period was from July 2007 to March 2008. During the study period, a survey using a semi-structured questionnaire was conducted to understand TB patients’ perspectives about this program. The survey instrument collected data on demographic characteristics and TB patient’s perceptions about the integrated TB/HIV services in Tiruchirapalli. Systematic sampling was used to recruit the study participants. Beginning August 2007 and for every month thereafter till December 2007, a list of newly registered TB patients was sent to the TRC from each of the 6 TB units. From this list, one out of three TB patients was selected for interviews
every month. This was done till December 2007, when the desired sample size of 300 was reached.

Inclusion criteria: Newly registered TB patients aged 15 years and above who were willing to participate in the study.

Face to face interviews were conducted by trained TRC staff with TB patients who fulfilled the inclusion criteria.

**Qualitative data: Interviews with health care providers**

Accompanied by a TRC staff (who acted as my guide), I visited one ART center, two TB units, three primary health care centers and two ICTCs, to recruit participants for this study. Ten health care providers (one ART medical officer, one PHC medical officer, two counselors, two Senior TB Supervisors, two Senior TB Lab Supervisors, one outreach worker and one pharmacist) were recruited using convenience sampling method. Purposive sampling could not be done as I had time and budgetary constraints and also because some health care providers were busy, refused consent or were absent during my visit to these centers. However, I made all efforts to recruit participants who worked at different levels of care in the integrated HIV/TB pilot program, to obtain their perspectives for this study. I approached the participants at their work-place and after being introduced by my guide, asked for their willingness to participate in this study. When willing, I obtained signed informed consent from each of them and conducted the interviews in a quiet place within the health care facility. Interview lengths varied between 20-30 minutes. I used a semi-structured questionnaire that focused on the providers’ perceptions on functioning of the integrated HIV/TB pilot
program, social stigma for HIV/AIDS and TB, barriers to the program and recommendations to improve the same to collect the qualitative data. The interviews were conducted in English or Tamil according to the health care providers’ preference and were tape-recorded after obtaining consent.

**Ethics approval:**

Ethics approval for this study was obtained from the Simon Fraser University Research Ethics Board.

**Analysis**

**Quantitative data**

The quantitative data was analyzed using SPSS software package 13 and Epi info 6. Descriptive statistics was used for the analysis of categorical and continuous variables. The chi-square test and Fischer’s exact test (for variables with expected frequency less than 5) were used to examine the association between demographic characteristics and acceptability of HIV testing in TB patients.

**Qualitative data**

Qualitative data was analyzed manually using thematic coding which included both “a priori” codes and emergent codes. Each interview was coded under the following broad categories a) grading of the current functioning of the integrated HIV/TB pilot program, b) barriers to the program and c) recommendations to improve the program. After coding all transcripts, most recurrent codes were taken to create sub-categories. Sub-categories were revised to generate emergent themes which can be found in the results section of this project report.
RESULTS

Results of quantitative data

Of the selected 300 TB patients, 16 were too sick to be interviewed, 8 were not traceable due to incorrect address, 22 had migrated to another place, 14 were pediatric patients (age less than 15 years) and 7 refused to give consent. 4 TB patients had died.

Satisfactory interviews were conducted with 229 TB patients.

Characteristics of the respondents:

The characteristics of the respondents (N=229) are shown in table1.

Table 1: Characteristics of the respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-34</td>
<td>68</td>
<td>30</td>
</tr>
<tr>
<td>35-54</td>
<td>110</td>
<td>48</td>
</tr>
<tr>
<td>&gt;55 years</td>
<td>51</td>
<td>22</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>153</td>
<td>67</td>
</tr>
<tr>
<td>Female</td>
<td>76</td>
<td>33</td>
</tr>
<tr>
<td><strong>Residential status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>100</td>
<td>44</td>
</tr>
<tr>
<td>Urban</td>
<td>88</td>
<td>38</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>41</td>
<td>18</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>39</td>
<td>17</td>
</tr>
<tr>
<td>Married</td>
<td>166</td>
<td>73</td>
</tr>
<tr>
<td>Widowed</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>64</td>
<td>28</td>
</tr>
<tr>
<td>Primary</td>
<td>48</td>
<td>21</td>
</tr>
<tr>
<td>Middle</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td>≥High school</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>66</td>
<td>29</td>
</tr>
<tr>
<td>Employed</td>
<td>163</td>
<td>71</td>
</tr>
</tbody>
</table>

Data source: TRC
Of the 229 TB patients interviewed, 67% (153) were males. The median age was 35 years. 17% (39) were single, 73% (166) married and 10% (24) widowed. 44% (100) lived in the rural areas of Tiruchirapalli and 29% (66) were unemployed.

**Referral details at the TB treatment centers**

89% (203/229) of TB patients were referred for HIV testing through this program and 93% (188/203) of those referred went to the ICTC for HIV testing. 7% (15/203) did not go because of the following reasons: less than 3 months of the last HIV test (11), long distance (2), no time (1), fear of testing positive (1). 36% (72/203) reported that they were asked to have HIV testing in the presence of other patients (privacy lacking in crowded out-patient departments). 55% (111/203) had been informed the rationale for routine HIV testing in TB patients at the TB treatment centers.

**Patient costs and travel distance to ICTC**

42% (78/188) of those who went to the ICTC said that they had spent less than Rs.10 (≈ 0.25 US$) for travel. 53% (100/188) of the respondents had to travel less than 5 kilometers to the nearest ICTC.

**Pre-test information, informed consent and number of visits to the ICTC**

48% (90/188) of the respondents reported that they received pre-test information while 75% (140/188) had signed the consent form. 51% (95/188) had to make more than one visit to the ICTC.

**Awareness of HIV test result and ART initiation**

94% (176/188) of TB patients who were tested for HIV/AIDS collected their result and 88% (165/188) of them were aware of their HIV status. The reason stated by majority (70%) of patients who did not collect their test result was the need to make more than one
visit to the ICTC. 16% (31/188) were HIV positive and all were referred to the ART center for further management. 67% (20/30) of those who attended the ART center were initiated on HIV treatment.

**Perceived problems of TB patients with PITC**

44% (89 out of 203) of the respondents said that they were not explained why they were required to undergo HIV testing at the TB treatment centers. The other problems cited were 1) the need to make more than one visit to the ICTC (51%) and 2) long distance to the nearest ICTC (13%). The following flow chart diagram (figure 6) summarizes the salient findings of the quantitative data analysis.

Figure 6: Flow chart on routine referral of TB patients for HIV testing

Data source: TRC
Association between demographic characteristics and visit to the ICTC

There were no significant differences (Table 2) between the two groups that visited ICTC and that which did not, with respect to age (p=0.8), sex (p=0.6), residential status (p=0.3) and occupation (p=0.6).

Table 2: Association between demographic characteristics and ICTC visit

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factors</th>
<th>Not visited ICTC (NV) n=15</th>
<th>Visited ICTC (V) n=188</th>
<th>Total (N=203)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Median age= 35)</td>
<td>&lt;=35</td>
<td>5</td>
<td>68</td>
<td>73</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>&gt;=36</td>
<td>10</td>
<td>120</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>188</td>
<td>203</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>9</td>
<td>129</td>
<td>138</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>6</td>
<td>59</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>188</td>
<td>203</td>
<td></td>
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<tr>
<td>Residential status</td>
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Data source: TRC

Results of qualitative data

Grading of the functioning of the integrated HIV/TB pilot program

Two of the ten health care providers graded the functioning of the pilot program as very good while six graded it as good and two as satisfactory. All the health care providers opined that it was necessary for TB patients to be tested for HIV/AIDS in order to identify HIV/TB co-infection early. Seven out of ten health care providers said that the
program had increased awareness among TB patients about HIV/TB co-infection while three opined that in rural areas, many TB patients were still unaware of the relationship between the two diseases.

**Barriers to the program**

**Stigma for HIV/AIDS and TB**

Social stigma for HIV/AIDS was identified by eight of the ten health care providers as a huge barrier to this program. According to them, stigma for HIV/AIDS was more than stigma for TB. Other two health care providers identified social stigma for both HIV/AIDS and TB as barriers that prevented many patients from seeking timely care.

“Stigma is a major obstacle for the program. Some adolescent girls say ‘we came to be treated for TB, not for HIV testing’. With counseling they agree. Unmarried girls worry about their parents’ reaction to HIV testing. Stigma for HIV is more than for TB” (counselor 1).

“There is stigma for both AIDS and TB. We go to TB patients’ houses to ask if they had been tested for AIDS. One TB patient told me not to come to her house again. She thinks others will find out she has TB” (outreach worker).

**Lack of adequate pre-HIV test and post-test counseling**

Two health care providers said that the present HIV counseling services were inadequate and that TB patients were not fully aware of the implications of HIV testing.

“Counseling should be improved. Some HIV positive patients are not aware of their HIV status even after post-test counseling and ask me what disease they have…”(ART Medical Officer).
One of the health care providers felt that some TB patients agreed for HIV testing because of the authoritative position of health workers and for the fear of not receiving good care if they did not comply.

“Illiterate and old people are not fully aware of what is AIDS. They undergo testing because the STS (Senior TB Supervisor) or doctor told them to. Some think they will not receive good care if they do not do the test” (out reach worker).

**Lack of HIV testing kits**

Two of the health care providers opined that lack of regular supply of HIV testing kits was an important barrier to the integrated HIV/TB program.

“We are getting more TB patients now for HIV testing. Sometimes there is shortage of kits and they (TB patients) get angry if we ask them to come next day” (counselor 2).

**Health care providers’ recommendations to strengthen the program**

- **Increase awareness about HIV/AIDS and HIV/TB co-infection**

  All health care providers opined that awareness about HIV/AIDS and HIV/TB co-infection must be increased to improve uptake of the program.

  “More awareness programs are essential. Some people in rural areas do not know what is AIDS. Some think it can come only due to immoral behavior. If we tell somebody to be tested for AIDS, they get offended. They think we suspect them to be immoral. Many are not aware of other modes of transmission of the disease….” (Senior TB Supervisor 2).

- **Capacity building**

  Three of the ten health care providers suggested that more trained counselors and ART staff be recruited.
“We need more staff. We counselors are overworked. If one staff goes on leave others suffer (counselor 1).

“We are experiencing heavy workload as more TB patients are referred for ART now. We need more doctors and counselors. Shortage of trained staff is a big problem” (ART Medical Officer).

• Co-operation between ICTC and RNTCP staff

The primary health care medical officer opined that regular meetings between HIV and TB care providers are necessary for improving the functioning of this program

“Regular meetings between RNTCP staff and ICTC staff are essential. Problems can be discussed and solved in these meetings…” (PHC Medical Officer).
DISCUSSION

The results of the pilot study conducted by the TRC have shown that provider initiated HIV testing and counseling can be satisfactorily implemented in Tamilnadu, India. This pilot study is the first study of its kind in India. Similar studies in South Africa (Levin et al 2006), and Zambia (Mwinga et al 2008) have shown that it is feasible and acceptable to offer HIV testing to TB patients routinely using the “opt-out” approach. However other studies from Malawi (Chimzizi et al 2004) and South Ethiopia (Jerene et al 2007) have shown that acceptability rates of HIV testing in TB patients were low (58% and 59% respectively).

The HIV prevalence rate in this study population is 16%. This is comparable to other studies in India that have shown HIV prevalence rates of 15% among TB patients in Pune (Paranjape et al 1997) and 17% in Chennai (Samuel et al 1996).

This study has important implications on the delivery of HIV care in TB patients in Tamilnadu, India. In addition to the clinical advantages (16% of HIV/TB co-infected patients were identified through this program), the positive findings of this study add important new insights to the possible integration of HIV services into existing TB control programs in Tamilnadu, India. This study has also helped in identifying several important barriers to the integrated HIV/TB program, namely social stigma for HIV/AIDS, lack of adequate counseling services, lack of ART staff and lack of HIV testing kits.

This study has limitations. “Recall bias” in survey participants is an important limitation. Also, as convenience sampling was used in the selection of health care providers, this study may have missed some important information.
RECOMMENDATIONS

The following are some of my recommendations to improve the functioning of the continuing integrated HIV/TB program.

**Strengthen existing counseling services**

This study has shown that counseling services in Tiruchirapalli need to be strengthened. Prior to HIV testing, TB patients must be made fully aware of a) the need for HIV testing, b) the “opt-out” option of HIV testing, and c) the implications of a positive result. More trained counselors need to be recruited. Also, counselors that are already in service need to be re-trained to provide adequate pre-test information to their TB clients. Provision of adequate pre-test information would enable TB patients make informed decisions about HIV testing and would prevent compulsory testing in them. TB patients need to be made aware of their human rights to refuse the HIV test and be assured that their decision of “opting-out” would not interfere with their access to TB services. Also, post-test counseling services for both HIV negative and HIV positive TB patients need to be strengthened as only 88% of those tested through this program were aware of their test results. Periodic evaluation of counselors’ work using patient surveys and offering incentives to those counselors with good evaluations could help improve the counseling services currently offered in Tiruchirapalli.

**Reduce social stigma for HIV/AIDS**

As social stigma for HIV/AIDS has been identified by the providers as an important barrier to this program, there is an urgent need for the government to increase awareness among the public in general and TB patients in particular about HIV/AIDS and HIV/TB
co-infection. Increasing awareness through programs that are tailor-made to suit illiterate people and rural dwellers would help reduce social stigma for HIV/AIDS in these communities and promote uptake of this program. Non-governmental organizations (NGOs) and other civil society members could be involved in conducting awareness programs especially in the hard to reach areas.

**Improve linkage between TB and HIV services**

Access to both HIV and TB care in HIV/TB co-infected patients could be increased by improving the linkage between HIV and TB programs. Training providers in HIV and TB curricula would increase their ability to provide correct information to their patients, reduce misconceptions about HIV and TB, improve patient-provider relationship and facilitate smooth integration of HIV and TB services. ICTCs could be located within TB treatment centers to facilitate HIV testing in TB patients and to reduce the number of people lost to follow up. Also, prompt referral of HIV positive TB patients to ART centers for further management and provision of support and care to TB patients initiated on ART would help improve treatment adherence in co-infected patients and reduce mortality and morbidity in them. Similarly, HIV positive patients with active TB disease or latent TB infection need to be referred to TB treatment centers for appropriate care and management. Capacity building and close collaboration at all levels of care between HIV prevention programs and TB control programs are vital for the maximum uptake and proper functioning of this integrated program.

**Increasing availability of ART and decentralization of HIV services**

Increasing availability of ART and decentralization of HIV services are essential for expanding access to services and improving treatment outcomes in HIV/TB
co-infected patients in Tiruchirapalli, India. As screening for HIV/AIDS in TB patients needs to be followed with provision of appropriate HIV care, the local and regional governments need to ensure availability and easy accessibility of ART in HIV positive TB patients. Moreover, similar to the DOTS strategy, ART can be provided through peripheral health institutions. This would promote treatment adherence in HIV positive people even after completion of ATT and reduce the number of people lost to follow up. Also, expansion of HIV testing and counseling services to the rural areas of Tiruchirapalli through mobile clinics and camps would reduce social stigma for HIV/AIDS and improve program outreach and uptake.

**Increasing HIV surveillance among TB patients**

Increasing HIV surveillance among TB patients is vital for the continued success of this program as it would provide a more accurate estimate of the incidence and prevalence of HIV/AIDS in TB patients and the number of HIV/TB co-infected patients in need of ART in this region. It would also help to understand changing patterns of TB/HIV epidemiology over time and facilitate planning and resource mobilization.

In order to achieve the above, other elements that fall outside the realm of direct health care services are also required, such as

**Sustained political will**

Sustained political will to fight the dual epidemics of HIV and TB using an integrated approach is vital for the good performance of this program. The local, regional and national governments need to ensure that proper guidelines for HIV counseling and testing for TB patients are implemented and followed at all levels of care in the HIV/TB
program. These guidelines need to be framed after consultations with all the stakeholders and should conform to local knowledge and beliefs of the people. Also, the governments need to ensure that the guidelines follow the 3 C’s of HIV testing namely confidentiality, informed consent and counseling.

**Future research**

Quality of life and mortality and morbidity rates in HIV/TB co-infected individuals need to be researched further. There is also an urgent need to develop new and more reliable laboratory tests to diagnose sputum negative pulmonary TB in HIV positive individuals. Additionally, more pharmacokinetic and clinical studies to assess the effects of concomitant ART and ATT administration in HIV/TB co-infected individuals are also required.
REFLECTIONS

One observable impact from this study was the positive feedback that I received from the health care providers that were interviewed. Majority of them opined that this study had provided them a platform to voice their opinions and to reflect on their roles as health care providers.

This study has enabled me to understand better the factors that facilitate or hinder the functioning of an integrated HIV/TB program in a resource poor country like India, and to ponder about practical and feasible suggestions to improve it. This study experience will be useful to me in my future role as a global health practitioner who intends to practice in India.

What could have been done differently?

Given more time, I would have liked to interview more health care providers to obtain their perspectives about the integrated HIV/TB pilot program. Also, I would have liked to visit the TB treatment centers and ICTC situated in the remote areas of Tiruchirapalli, to understand the study setting better. This was not possible due to poor transport facilities in these areas and also due to my time and budgetary constraints.
CONCLUSION

The findings of the pilot study conducted by TRC in Tiruchirapalli have shown that it is feasible and acceptable to implement HIV testing among TB patients in Tamilnadu, India. However, several barriers to the integrated HIV/TB program have been identified through this study that needs to be addressed for the continued success of the program. Also, further studies are required to determine the feasibility of implementing similar programs in other states of India. If the findings of this study are confirmed by further research, then the integration of TB and HIV services is likely to be a highly acceptable intervention for TB patients in India. If this is the case, then this intervention has tremendous potential to be the key public health response to the dual epidemics of TB and HIV in India.
REFERENCES


Garrait, V., Cadranel, J., Esvant H, Herry, I., Morinet, P., Mayaud, C et al. (1997).Tuberculosis generates a microenvironment enhancing the productive infection of local lymphocytes by HIV. Journal of Immunology, 159(6), 2824-30.


