



Original Research Article

Pulmonary Tuberculosis co-infection among HIV infected persons in and around District of Erode, Tamil Nadu, India

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ABSTRACT

Keywords

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To find out HIV infectivity, totally 775 serum samples were analysed from persons between <14 and >50 years age group who attended Perundurai medical college hospital, Erode. Out of 775 samples, 126 (16.26%) samples, 81(10.45 %) males and 45 (5.81 %) females were HIV positive. Patients (45.2 %) at the age group 30-39 years were severely affected. Daily wages (25.40 %) showed high infectivity followed by drivers (20.63 %). Mainly heterosexual route was found to be the major risk factor for AIDS. When all 126 HIV patients were tested for Mycobacterium tuberculosis infection, 38 (30.16 %) patients, 30 (23.81 %) males and 8(6.35 %) females showed positive result. HIV and TB co-infection was mainly observed in patients (42.10%) at the age group of 30-39 years. Daily wages (28.95 %) followed by drivers (18.42 %) were severely affected. The results of the study suggest that proper screening of HIV infected at earliest for TB since TB may influence rapid progression to AIDS if left untreated.

Introduction

AIDS is the commonest cause of death affecting 40 million people worldwide. HIV infection leads to an immunocompromised state in the affected persons who are more sensitive for opportunistic infections caused by bacteria, fungi, viruses and parasites. In developing and developed countries, tuberculosis (TB) caused by Mycobacterium tuberculosis is a major opportunistic infection. In India about 1.8 million new cases of TB have

fifth of new cases in the world (Steinbrook, 2007). One third of tuberculosis patients also have HIV infection. Both the diseases interact on each other and worsen the prognosis and increase the mortality (Bevilacqua *et al.*, 2002). The high prevalence of active TB in AIDS patient was first noticed by Viera *et al.*, (1983). It may be difficult to diagnose the patients with HIV and TB if the HIV status of the patient is not known.

Symptoms such as fever, night sweat and recent weight loss may be noticed in the patients but are not specific for TB. The exact mechanism and interaction by which tuberculosis accelerates the progression of HIV disease remain unclear. The co-infection of HIV and TB in India varies widely and many studies have been reported increasing rates reflecting the spread of HIV in the general population (Paranjape *et al.*, 1997., Khare *et al.*, 2001; Chakaya *et al.*, 2008). The objective of this study was to find out the HIV infectivity and the prevalence of pulmonary tuberculosis among HIV infected patients in and around Erode district, Tamilnadu, India.

Materials and Methods

A total of 775 clinically suspected cases of AIDS with different age groups from different regions of Erode and its surroundings attending Perundurai Medical College Hospital, Tamilnadu, India were analysed. From the persons after counseling, informed consent and detailed history including social background, drug abuse, sexual risk behaviour and blood transfusion were obtained prior to sample collection. About 2 mL of blood was collected aseptically and allowed to clot. Serum was separated by centrifugation and tested for antibodies to HIV I and HIV II by using commercial ELISA kits. Samples of all patients which were positive in the initial screening test done by HIV TRIDOT ELISA kit (J. Mitra & Co, New Delhi, India) were retested by EIA comb kit (Cambridge Biotech, Maryland, USA) to avoid false positive result. From the confirmed HIV positive patients, sputum was collected and examined for the presence of acid fast bacilli by conventional Zeihl-Neelson staining technique. Radiological analysis

and culture method using Lowenstein-Jenson medium were also used to diagnose pulmonary tuberculosis in acid fast bacilli negative smear cases.

Results and Discussion

Of the 775 serum samples analysed, totally 126 persons 81 (10.45 %) males and 45 (5.81 %) females had HIV infection. Among them patients at the age group of 30-39 years showed high infectivity (45.24 %) followed by 40-49 years age group patients (23.81 %) as shown in table 1. As table 2 shows the mainly affected were daily wages (25.40%) followed by drivers (20.63%). When the mode of acquisition of infection was ascertained in all 126 HIV infected patients, 115 (91.27%) became infected with HIV through heterosexual contact, 6(4.76%) through blood transfusion and 5 (3.97%) due to parent to child transmission, No one was infected with syringe and needle (Table 3).

Pulmonary tuberculosis (PTB) in HIV positive patients were confirmed by sputum staining, culture test and radiological reports. As given in table 4, totally 38 (30.16 %) patients, 30 (23.81 %) males and 8(6.38 %) females showed HIV/AIDS and TB co-infection. They were mainly at the age group of 30-39 years, 11(36.66 %) males and 5 (62.50 %) females. Mainly daily wages (28.95%) and drivers (18.42 %) had both the diseases (Table 5).

The study results showed sexually active age group persons especially daily wages and drivers between 30 - 49 years involving in various work activities have been affected. Similar results have been already reported (Kumar *et al.*, 2002). In contrast to this result, farmers to maximum

Table.1 Age / sex distribution of HIV positive cases

Age	No. of HIV suspected cases	HIV positive cases		
		Males	Females	Total
Less than 14	131	4 (4.94 %)	1 (2.22 %)	5 (3.66 %)
15 – 19	24	-	1 (2.22 7%)	1 (2.22 %)
20 – 24	69	4 (4.94 %)	3 (6.66 %)	7 (5.55 %)
25 – 29	77	8 (9.87 %)	5 (11.11 %)	13 (10.32 %)
30 – 39	186	32 (39.51 %)	25 (55.55 %)	57 (45.24 %)
40 – 49	141	23 (28.39 %)	7 (15.55 %)	30 (23.81 %)
50 and Above	147	10(12.34 %))	3 (6.66 %)	13 (10.32 %)
Total	775	81 (10.45%)	45 (5.81%)	126 (16.26%)

Table.2 Distribution of HIV patients according to occupation

Occupation	No. of Patients	Percentage (%)
Daily Wages	32	25.40
Drivers	26	20.63
Farmers	14	11.11
Household	20	15.87
Business	22	17.46
Others	12	9.52
Total	126	100

Table.3 Route of transmission in HIV positive cases

Route of Transmission	No. of Males	No. of Females	Total
Heterosexual	76	39	115 (91.27%)
Homosexual	-	-	-
Through Blood and Blood Products	1	5	6 (4.76%)
Through Infected Syringe and Needles	-	-	-
Parent to Child Transmission	4	1	5 (3.97%)
Other	-	-	-
Not Specified	-	-	-
Total	81	45	126

Table. 4 Age / sex distribution of HIV positive tuberculosis patients

Age (in years)	No. of HIV positive undergoing TB test	No. of HIV Positive Tuberculosis		
		Males	Females	Total
Less than 14	5	-	-	-
15 – 19	1	-	-	-
20 – 24	7	1 (3.33 %)	-	1 (2.63%)
25 – 29	13	4 (13.33 %)	-	4 (10.53%)
30 – 39	57	11 (36.66 %)	5 (62.5 %)	16 (42.10%)
40 – 49	30	9 (30.00%)	3 (37.50 %)	12 (31.57 %)
50 and Above	13	5 (16.66 %)	-	5 (13.16 %)
Total	126	30 (23.81%)	8 (6.35%)	38 (30.16%)

extent and drivers to less extent have been reported to get infection with HIV (Rajasekaran *et al.*,2000). Dhungana *et al.*, (2008) reported high TB cases in HIV positive persons with 21-30 age group and no significant relationship between gender and TB. Heterosexual (91.27 %) route acted as a risk factor in our study in contrast to homosexual (80 %) as risk factor (Chaisson *et al.*,1987). These results are due to the differences in their occupation and source. HIV affects CD4+ T-lymphocytes. When CD4+ count falls below 400/ microlitre, the patient develops early opportunistic infections (Chakraborty and Charaborty, 2000).

TB causes a major health problem in developing countries and claims about 3 million persons world wide each year. Our study shows 16 (42.10 %) had HIV and PTB co-infection. This is high compared with the previous studies carried out at Vellore (16 %) by Chacko *et al.*, (1995) and at South-India and Cuttack (25 %) by Dash *et al.*, (2004). The high rate of PTB in HIV cases is mainly attributed to the weak immune system brought by HIV infection.

The poverty, illiteracy and high cost of anti TB drugs for the proliferation of TB are the causes for tuberculosis. Mycobacterium tuberculosis can be dormant and persist in unfavourable conditions in the presence of anti-TB drugs. Cheap and quick antibodies based diagnostic tools are lacking nowadays to detect the disease. Culture method takes as long as 6-8 weeks. But the molecular technique PCR has been reported 100% specific and 83% sensitive for PTB (Sahai,2004). HIV patients with the symptoms such as cough more than 2 weeks ,fever more than 2-3 weeks, weight

loss, chest pain, lymphadenitis, head ache, vomiting and convulsions should be suspected of having TB (Swaminathan,2002). Our data clearly show that PTB is more common in HIV infected who got the disease by heterosexual contact.

Tuberculosis in HIV patients is due to the endemic presence of Mycobacterium tuberculosis. Mycobacterial blood culture appears to be a useful diagnostic tool in the early diagnosis of TB in HIV positive persons because acid fast staining cannot show the organism in the sputum when they are in latent stage (David *et al.*,2004). HIV patients are more likely to have negative sputum smears. X-ray abnormalities which are not specific for TB are even more non-specific in HIV infected patients. PTB infections due to other opportunistic pathological organisms must be evaluated (Hira, 2001).

The worsening TB epidemics in India require urgent and effective attention. Countries with high prevalence of TB need proper implementation of Directly Observed Treatment Short-Course (DOTS) and BCG vaccination in early childhood (Narain, *etal.*, 2002). Antiretroviral therapy is essential for reducing the number of deaths from tuberculosis that is related to HIV infection (Williams *et al.*, 2005). The combined use of a protease inhibitor i.e. anti HIV drug with rifampicin is regarded as contraindication for the treatment (Nagai, 2003). Even though the TB preventive therapies are effective in reducing the incidence of TB for the infected HIV persons especially adults, their benefit of delaying HIV disease progression to AIDS could not be observed (Lim *et al.*, 2006).

In conclusion the present study shows 30-39 years old drivers and daily wages are severely affected with TB and HIV co-infection. The results strongly emphasize proper screening of HIV positive cases for tuberculosis and proper treatment in order to prevent rapid progression to AIDS.

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