

PREVALENCE OF TUBERCULOSIS AMONG HIV POSITIVE PATIENTS ATTENDING ICTC IN A TERTIARY CARE INSTITUTE IN AHMADABAD, A WESTERN CITY OF INDIA

Nayak S¹, Karia J², Patel P³, Modi B⁴, Desai K⁴, Patel B⁵

^{1,4,5} Department of Community Medicine, Surat Municipal Institute of Medical Education and Research (SMIMER), Surat, Gujarat, India

^{2,3} Department of Microbiology, GMRES Medical College, Sola, Ahmadabad, Gujarat, India

ABSTRACT

Introduction: In India, tuberculosis is the most common opportunistic infection among HIV positive patients. This study estimates the prevalence of tuberculosis amongst HIV patients in Ahmadabad, Gujarat.

Methodology: The present study was conducted at Integrated Counseling and Testing Center for HIV at Sola civil hospital, a public sector tertiary care hospital in Ahmadabad for a twenty month period from January, 2009 to August, 2010. All the patients visiting the center during the study period were screened for HIV. All the patients who were diagnosed HIV positive were subjected for active search of tuberculosis; clinically, radiological as well as by histopathology and laboratory tests.

Results: Total 6846 patients were screened for HIV, out of which 167(2.44%) patients were tested HIV positive. Out of 167 HIV positive patients, 22 (13.17%) were diagnosed as cases of tuberculosis. Out of these 22 patients, 18(81.82%) had pulmonary tuberculosis while 4(18.18%) were extra-pulmonary tuberculosis patients. Amongst the four extra-pulmonary tuberculosis cases, one (25.00%) case was of tuberculous meningitis, one (25.00%) was of abdominal tuberculosis and two (50.00%) had tuberculous lymphatic swelling.

Conclusion: The prevalence of tuberculosis in HIV positive patients found in this study was 13.17%, which is substantially lower than that reported in previous studies. Appropriate management of these patients requires a strengthened mechanism of cross reference and inter sectoral co-ordination between the two diseases at all levels.

Key words: HIV/AIDS, Tuberculosis, Prevalence

INTRODUCTION

Tuberculosis, though an ancient disease, continues to remain a major public health problem in much of the developing world even today. Worldwide it is the most prevalent infectious cause of human suffering and death.¹ The problem is now further complicated

by relentless spread of HIV and associated AIDS pandemic. HIV infection aggravates the progression to active disease in people infected with tuberculosis (TB). HIV infected individuals co-infected with TB bacilli have an annual risk of 5-15% of developing active TB.² In India, TB is the most common opportunistic infection among HIV sero-positive patients.³ Currently in India 2.5 million people are infected with HIV of whom 40% are co-infected with TB.^{4,5} HIV-TB co-infection represents a deadly combination. The co-infection is associated with various factors like malnutrition, unemployment, alcoholism, drug abuse, poverty, homelessness and illiteracy.⁶

Correspondence:

Dr. Sunil Nayak
Associate Professor, Community Medicine Department
GMERS Medical College, Dharapur,
Patan, Gujrat, India
Email: drsunilnayak@gmail.com

Further, appropriate management of patients with TB-HIV requires not only treating the TB and HIV alone but a strengthened mechanism of cross reference between the Anti-retroviral treatment (ART) centre and Directly Observed Treatment Short Course (DOTS) centre wherever indicated. If HIV prevalence in the community continues to increase, it could affect the TB control program, by decreasing cure rates and increasing mortality and recurrent TB.

So the present study was planned with the objective of estimating the prevalence of TB in HIV positive patients attending Integrated Counseling and Testing Center (ICTC) for HIV of a tertiary care public hospital at Ahmadabad, India.

METHODOLOGY

Study design: This is a cross-sectional study.

Study setting: The study was conducted in ICTC centre of tertiary care public hospital in Sola, Ahmadabad, Gujarat, India.

Study period: January, 2009 to August, 2010

Sampling: All patients (n=6846) attending ICTC centre during the study period were included in the study.

Data collection: All patients attending ICTC in the study period were initially screened for HIV testing by various spot kits like Immunocomb, Tridot, SD HIV rapid test as per the National AIDS Control Programme (NACP) guidelines. Those who were found to be positive were rechecked by Enzyme Linked Immunosorbent Assay (ELISA) test before sending samples as a positive. An active search for TB disease was made in all HIV positive cases based on combined results of clinical, radiological, histo-pathological and laboratory investigations in accordance with protocol established by Revised National Tuberculosis Control Program (RNTCP).

Patient was diagnosed as a case of Pulmonary TB as per RNTCP protocol if

- 1) Either sputum smears (sputum acid-fast bacilli) positive 'OR'
- 2) Sputum smears negative but meeting all three of the following clinical criteria
 - a. Symptoms suggestive of TB
 - b. Chest X – Ray (Posterior-Anterior view) suggestive of TB

c. A positive anti – TB treatment response

Diagnosed of extra-pulmonary TB case as well determination of the focus of it was based on clinician's final judgment. This in turn was based on clinical examination as well as routine investigations like Hemoglobin (Hb), Total Lymphocyte counts (TLC), Differential Lymphocyte count (DLC), Erythrocyte Sedimentation Rate (ESR), urine (albumin, sugar and microscopic examination) performed in all cases. Other investigations like Fine Needle Aspiration Cytology (FNAC) of enlarged lymph nodes, abdominal ultrasonography (USG) and lumbar puncture were also performed on case to case basis as per the clinician's advice.

Ethics: The study was approved by the Institutional Ethical Committee (IEC) of Sola medical college. Informed consent was taken from all participants before testing. Pre-test counseling was also assured in all participants. Patients diagnosed with TB were started on Anti-TB Treatment (ATT) and were subjected to clinical and laboratory monitoring on a periodic basis and also at the conclusion of ATT from ethical point of view.

Data analysis: Data entry was done followed by data analysis using Epi Info 2007. Descriptive analysis with frequency distribution of patients for different variables was carried out.

RESULTS

Total 6846 patients were screen for HIV during a study period of 20 months, out of this 167(2.44%) patients were found HIV positive. All 167 patients were screened for TB. Out of them (167), 22 (13.17%) were diagnosed TB positive and 145(86.83%) were TB negative (Table 1).

Table 1 shows that out of total 22 TB patients among HIV patients, 18(81.82%) had pulmonary TB while 4(18.18%) were extra-pulmonary TB patients. Out of 18 pulmonary TB, 12(66.67%) were detected by sputum examination with Zeil Nelson (ZN) staining and 6(33.33%) were detected by X-Ray chest findings. Amongst four extra-pulmonary TB cases, one (25.00%) case was of TB meningitis, one (25.00%) was of abdominal TB and two (50.00%) were of TB lymphatic swelling.

Table 1. Distribution of tuberculosis among HIV positive patients				
Amongst HIV positive patients(n=167)		Total HIV positive	Total patients screened	
Tuberculosis positive	Tuberculosis negative			
22(13.17%)	145(86.83%)	167(2.44%)	6846(100%)	
Amongst Tuberculosis positive patients (n=22)				
Pulmonary tuberculosis		Extra-pulmonary tuberculosis		
18(81.82%)		4(18.18%)		
Amongst pulmonary tuberculosis patients (n=18)		Amongst extra-pulmonary tuberculosis patients (n=4)		
Diagnosed by Ziehl-Neelsen stain	Diagnosed by chest X-ray	Tuberculosis meningitis	Abdominal tuberculosis	Tuberculous lymphatic swelling
12(66.67%)	6(33.33%)	1(25.00%)	1(25.00%)	2(50.00%)

Out of total 167 HIV positive patients, 108(64.67%) were males and 59(35.33%) were females. Maximum number of HIV positive patients 69(41.32%) were from 25 to 34 years of age (43(25.75%) males and 26(15.57%) females). After that 62(37.13%) of patients were from 35 to 49 years of age (41(24.55%) males and 21(12.57%) females).

Our study shows maximum number of TB patients 9(40.91%) among HIV positives were also from 25 to 34 years of age group. After that 8(36.36%) of patients were from age group of 35 to 49 years. Only 2(9.09%) of patients were less than 14 years of age.

Among TB patients, 16(72.73%) patients were males and 6(27.27%) were females.

DISCUSSION

The prevalence of TB amongst HIV positive patients at ICTC was 13.17% in present study. Another Madras bases prospective study by Solomon S et al in 1995 (n=1430) on trends on HIV infection in Pulmonary TB showed the co-infection prevalence to be 3.4%.⁷ Ghate MV et al from Pune in his cross-sectional studies conducted consecutively for three years have shown the prevalence of TB in HIV infection to be 11.8%, 9.94% and 7.4% in the year 1997, 1998, 1999 respectively (n=3574).⁸ While in contrast to this one Lucknow based cross-sectional study by Sircar AR et al in 1998 (n=74) showed the same prevalence to be quite high, that is 54.8%.⁹ Kumar P et al, 2002 from Delhi showed that the prevalence of Acid Fast Bacilli (AFB) positive sputum amongst HIV patients is 21.4%, while

the prevalence of extra pulmonary TB infection is almost double that is 45.6% (n=306).¹⁰ Similarly the prevalence of Multi drug resistant (MDR) TB amongst HIV infected persons was found to be 4.42% by a Chennai based investigator in 2002 in a cross-sectional study conducted on 1000 patients.¹¹ A case control study (n=1009) conducted in Mumbai by Hira SK et al (n=1009) have shown the prevalence of TB amongst HIV cases is 25.4%.¹² Where as a Calcutta based cross-sectional study have shown the same prevalence of TB among HIV patients to be 27.7%.¹³ Likewise a study on Bone TB prevalence amongst HIV patients have found the prevalence of the same to be around 40% (n=140).¹⁴ Mahajan A et al from Jammu has shown the prevalence of HIV-TB co-infection of 16.52%.¹⁵

Thus it is evident from above evidences that there is wide regional variation in the prevalence of HIV-TB co-infections in India and hence findings of one region cannot be extrapolated to other regions without a proper study. Though difference in the strengths of study designs, sample size and study period (prospective studies superior than cross-sectional) as well as center to center diagnostic capabilities especially for extra pulmonary TB and lack of standard to compare for the same might also be responsible for these huge variations.

There are also many studies from out of India showing different rate of HIV prevalence, indicating even a huge inter country variation in addition to the intra country variation for the same. Like a review study from Netherlands in 90's (n=13269) has shown the prevalence of HIV amongst TB patients to be around 4%¹⁶, while a study from

Ukraine has shown the prevalence of co-infection to be 6.3% and 10.1% respectively in 2002 (n=567) and 2004 (n=968) respectively¹⁷, where as a hospital based review study from Nigeria has shown the same prevalence to be around 28.12% (n=777)¹⁸, which is again in contrast to another Uganda based retrospective evaluation (n=6305) of 5%¹⁹, and Atlanta, USA based cross-sectional evaluation (n=272) of 1% sero-prevalence among TB patients.²⁰

To promote early diagnosis and treatment of TB in HIV infected individuals and vice versa, at the national level, there is a concerted effort to achieve coordination between the designated microscopy centre (DMC) of the RNTCP and the ICTC of the HIV/AIDS control program not only to improve the outcome of HIV-infected TB patients but also to control the burden of tuberculosis in India²¹. As a part of this all ICTC clients with suggestive symptoms are referred by the counselor to the nearest microscopy centre for investigations to rule out TB.²¹ In 2007, approximately 5% of all diagnosed TB cases in India came from ICTCs.²¹

Our study shows pulmonary involvement in 81.82% of cases which is almost equal to results of Deivanayagam et al, 2001 and Ahmad and Shameem, 2005 which shows pulmonary involvement of about 75% of all HIV infected patients with TB.^{22, 23} TB-HIV co-infection is already a well recognized public health problem particularly in developing countries.^{1,9,10} HIV infection is the most potent factor in transforming latent or recently acquired TB infection to active clinical disease.^{24, 25}

Extra-pulmonary TB is the commonest cause of pyrexia of unknown origin (PUO) among HIV positive individuals in developing countries and is more common among people with advanced HIV disease.^{26,27} The most frequent extra-pulmonary form of TB is involvement of the lymph nodes with cervical region being the commonest.²⁸ The other forms of extra-pulmonary TB include pleural effusion, pericardial effusion, abdominal TB, TB meningitis and abdominal TB.²¹ In current study 4 (18.18%) were extra-pulmonary TB patients with two of them having tuberculous lymphatic swelling, one having abdominal TB and one case of TB meningitis. Another study by Mansoori et al showed 80.9% cases of smear-positive pulmonary

TB, 10.9% of smear-negative pulmonary TB; and 8.2% of extra-pulmonary TB which consisted of 3 cases of TB lymphadenitis, one pleural TB case, one case of TB meningitis, and one liver TB case.²⁹

Patients with HIV co-infection may not have typical radiographic features of pulmonary tuberculosis on chest X-ray and it may be normal in 5-10% of individuals.³⁰ While patients with higher CD4 cells (>350 cells/mm³) have radiographic abnormalities similar to their HIV negative counterparts, patients with immunosuppression often have minimal or atypical findings which includes diffuse pulmonary infiltrates/opacities dominantly and uncommonly cavitation.³¹ Miliary pattern, mediastinal adenopathy and pleural effusion are also more common.³⁰ In current study out of total diagnoses pulmonary TB cases 33.33% were diagnosed by chest x-ray.

Our study shows that out of total HIV positive patients, 35.33% were females, which is almost equal to National AIDS Control Organization (NACO) report 2007 showing that among all HIV positive patients 31.2% are females.³² Yadav DK et al showed the proportion of females amongst the HIV positives of 24.8%.³³

Our study reveal that maximum number of HIV positive patients 69(41.32%) were from 25 to 34 years of age. Yadav DK et al revealed that majority of HIV positive subjects are in the age group of 30-39 years (48.8%).³³

Our study shows that maximum number (40.90%) of TB-HIV co-infected positive patients were from 25 to 34 years of age group. After that 36.36% of patients were from age group of 35 to 49 years. These results are almost equal to Bernard J Ngowi et al's findings which shows the same prevalence as 45.0% and 30.0% in the age group of 25 to 34 years and 35 to 49 years respectively.³⁴ Yadav DK et al revealed that 60% of TB/HIV co-infected belonged to the age group (31-40) years, while 35.7% of subjects was belonged to age group (21-30) years.³³ Mansoori D et al revealed that 64% of TB/HIV infected patients were 20-40 years old and 36% were 41 years old or more.²⁹

Limitation:

It is possible that some under diagnosis, especially of extra-pulmonary TB as well as sub clinical

infections did occur, as our diagnostic methods were restricted to sputum smears, radiographs, clinical judgment and routine laboratory tests. Other investigations like USG, FNAC was done only in symptom suggestive patients based on clinician's advice.

CONCLUSION

In this study 22(13.17%) subjects were patients with HIV-TB dual disease, most of whom were pulmonary TB cases. This prevalence is substantially lower than that reported in previous studies indicating regional variations in the prevalence of the same.

Further appropriate management of these patients requires a strengthened mechanism of cross reference and inter sectoral co-ordination between the two diseases at all levels which requires further operational research. One of the programmatic limitations encountered in this is the lack of investigations for extra-pulmonary TB at peripheral health facilities.

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