

“HIV Co- Infection among Tuberculosis Patients in a tertiary care hospital Kanpur”

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Abstract:

Background: Emergence of Human Immunodeficiency Virus (HIV) has paved way for the resurgence of Mycobacterium tuberculosis infection. While HIV is the most powerful risk factor for the progression of M. tuberculosis infection to Tuberculosis (TB) disease, TB accelerates the progression of HIV infection to Acquired Immunodeficiency Syndrome (AIDS) and shortens the survival of such patients.

Objectives: To find the HIV co-Infection among Tuberculosis Patients in a tertiary care hospital, Kanpur.

Methods: The present study was conducted in the Department of Microbiology, in a Rama medical college hospital & research centre Kanpur India over a period of one year from July 2021 to Dec 2021. Ethical clearance was duly obtained from the Institute Ethical Committee for conducting the study. Samples were collected from patients attending Integrated Counseling and Test Centre (ICTC) & DOTs clinic of the hospital referred from various OPD & Indoors Clinical samples including blood and sputum were taken from the patients following the guidelines of NACO & NTEP India after obtaining due informed consent.

Results: In this study of total 36 patients confirmed TB patients, Of these 7 (19.4%) were females and 29 (80.5%) were males. There were more patients in the 21–51 years age group 30 (83.3%) than in any other age group. Patients between 1 and 20 years of age were the least (2.7%). These 36 TB confirmed cases were screened for presence of HIV antibodies. The overall prevalence of co-infection of M. tuberculosis and HIV in this population was 8(22.2%). According to genderwise distribution, it was 6 (75%) and 2(25%) among males and females, respectively. The prevalence of co-infection also varied with age of the patients. It was highest among TB patients aged 21–51 years 5(62.5%) followed by those aged 51–61 years 2(25%), more than 60 years 1(12.5%), and least among those aged 1–20 years (0%).

Conclusion: The study showed that 22.2% of HIV infected persons had tuberculosis co-infection. More strategic preventive measures that enhance body immunity among HIV patients are highly needed as early as possible before they develop active tuberculosis

Keywords: Tuberculosis, HIV, Prevalence, Pulmonary tuberculosis.

Introduction

Emergence of Human Immunodeficiency Virus (HIV) has paved way for the resurgence of Mycobacterium tuberculosis infection. While HIV is the most powerful risk factor for the progression of M. tuberculosis infection to Tuberculosis (TB) disease, TB accelerates the progression of HIV infection to Acquired Immunodeficiency Syndrome (AIDS) and shortens the survival of such patients.[1,2] Currently 2.27 million people are infected with human immunodeficiency virus (HIV) with an estimated adult prevalence rate of 0.31% in India alone [3]. Co-infections lead to frequent morbidity and mortality which shortens the life span of people with HIV infections and requires expensive treatments which becomes a burden for a developing country like India. Timely initiation of prophylaxis of

Co-infections, quick recognition and treatment are the only economically viable options. It has been reported that decrease in CD4+ count is partially responsible for major immunodeficiency's that leads to most of the co-infections among HIV infected individuals [4]. The most common co-infections in HIV infected individuals are tuberculosis, chronic diarrhoea, candidiasis, HSV-2, CMV, HCV and HBV Co-infection with HIV is associated with significantly increased likelihood of mortality from TB disease, and HIV co-infected TB patients have significantly lower cure rates and lower treatment success rates compared to non-HIV infected TB patients [5,6]. HIV patients with active TB disease have a probability of dying of 15–20 % at 1 year while those without active TB disease have 7–8 % probability of dying at 1 year [7]. Persons infected by Tubercle bacilli have about a 10% chance of developing tuberculosis during the remainder of their lives: Thus, they have a less than 0.5% chance of developing overt disease annually,[8] while 10% of persons infected by both TB and HIV develop tuberculosis disease annually. The implication of HIV infection is that it activates dormant tuberculosis to rapid disease progression of tuberculosis and death.[9] In fact, tuberculosis is now the most common opportunistic

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infection in patients from developing countries who die from AIDS.[10] Reports show that active tuberculosis increases the morbidity and fatality of HIV-infected person and about one-third die of tuberculosis.[11]

The largest increase in tuberculosis has occurred in locations and demographic groups with the highest HIV prevalence, which suggests that the epidemic of HIV is at least partially responsible for the increase of tuberculosis.[12] There is evidence that immune responses in tuberculosis and in other infection induce cytokines that enhance the replication of HIV and this drives the patient into full picture of AIDS.[13]

Material and Methods

The present study was conducted in the Department of Microbiology, in a Rama medical college hospital & research centre Kanpur India over a period of one year from July 2021 to Dec 2021. Ethical clearance was duly obtained from the Institute Ethical Committee for conducting the study. Samples were collected from patients attending Integrated Counseling and Test Centre (ICTC) & DOTs clinic of the hospital referred from various OPD & Indoors Clinical samples including blood and sputum were taken from the from the patients following the guidelines of NACO & NTEP India after obtaining due informed consent.

Inclusion criteria

Any individual who has been diagnosed with active TB disease based on the Indian national TB Guidelines recommendations He or she has been started on a course of anti-TB treatment regimen within the time frame of the study period

Exclusion criteria

Any individual who has taken less than 4 weeks of the course of anti-TB treatment regimen Individuals less than 15 years of age at initiation of anti-TB treatment?

Sample collection

Venous blood sample (5 ml) was collected in a plain container from all the patients who consented for testing. Blood was allowed to clot for 30 min at room temperature (25–30°C) and serum was separated after centrifugation at low speed. The serum samples were then stored at 4°C and were tested within 48 hours.

Results

In this study of total 36 patients confirmed TB patients, of these 7 (19.4%) were females and 29 (80.5%) were males.

Table No1: Gender wise distribution of patients from the study

S.No.	Gender	Number of Isolates	Percentage
1.	Male	29	80.5%
2.	Female	7	19.4%

Table No 2: Age wise distribution of patients from the study

S.No.	Age (in years)	No. of Patients	Percentage
1.	10-20	1	2.7%
2.	21-30	10	27.7%
3.	31-40	12	33.3%
4.	41-50	9	25%
5.	51-60	2	5.5%
6.	≥61	2	5.5%

There were more patients in the 21–51 years age group 30 (83.3%) than in any other age group. Patients between 1 and 20 years of age were the least (2.7%). These 36 TB confirmed cases were screened for presence of HIV antibodies. The overall prevalence of co-infection of M. tuberculosis and HIV in this population was 8 (22.2%).

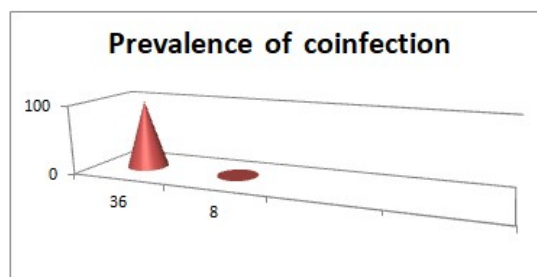


Figure: 1 Prevalence of Co-infection

According to gender wise distribution, it was 6 (75%) and 2(25%) among males and females, respectively. The prevalence of co-infection also varied with age of the patients. It was highest among TB patients aged 21–51 years 5(62.5%) followed by those aged 51–61 years 2(25%), more than 60 years 1(12.5%), and least among those aged 1–20 years (0%).

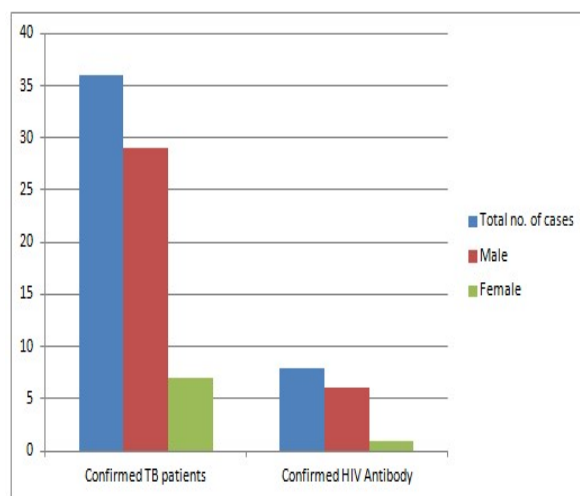


Figure 2: Total no of cases with HIV co-infection with gender wise distribution

Discussion

Tuberculosis is a major public health problem in most of the developing world, which is now posing a big threat with the worldwide epidemic of Human Immunodeficiency virus (HIV) infection. Globally, there are more than 14 million persons dually infected with TB and HIV [14-15] and India accounts for more than 1 million of them [16-17].

In the present study, a total of 36 patients confirmed for TB were studied. These 36 TB confirmed cases were screened for the presence of HIV antibodies. The overall prevalence of co-infection of *M. tuberculosis* and HIV in this population was 8(22.2%). Our study was in support with the studies performed by other authors [18] where the co infection between TB and HIV was observed. In our study the patients with the age group of 21–51 years age group 30 (83.3%) was affected the most than in other age group. Patients between 1 and 20 years of age were the least (2.7%). This study was parallel to the study performed by another author where the prevalence of co infection varies with age of the patient. It was highest among HIV patients aged 21-40 years(57.57%) followed by those aged 41-60 years (30.30%), 1-20 years(12.12%). There was the another study performed in 2014 where the prevalence of HIV-TB co infection was 21.59% of which 53.2% are male patient and 46.8% are female. Maximum incidence (71.43%) is found in 30-45 yr age group (Gautam L et al., 2014) [18].

In a study performed by Solomon Ahmed Ali et al [19] out of a total of 575 TB patients enrolled into the study, 360 (62.6 %) were non-HIV infected, 169 (29.4 %) were HIV co-infected. There was the another study performed by Sandhya S Sawant et al.[20] where out of the 432 patients screened, 9% (39) were HIV positive. The prevalence of co-infection was higher among females (9.4%) than the male (8.7%) patients and highest amongst those aged 21 to 40 years (13.7%). This prevalence rate was in contrast with our study where, overall prevalence of co-infection of *M. tuberculosis* and HIV in this population was 8(22.2%), of which 6 (75%) for males and 2(25%) for females, respectively. Another study by Peter Nsubuga stated higher prevalence for the females patients [21]. There was the another study by Lata B.Galate et al, [22] which was similar to our study with the overall prevalence with co infection of *Mycobacterium tuberculosis* (MTB) and HIV was 17.93 %. Out of these 21 were males and 12 were females. Tahziba Hussain et al.[23] stated that the HIV and HBV status was determined and correlated with clinical features at the time of testing, where sero-prevalence of HIV infection among TB patients is 1.48% (18/1215) and that of HBsAg reactivity was found to be 2.96% (36/1215). Screening of all HIV positive patients for TB and all HIV suspected TB positive patient as per our national programs has increased the rate of diagnosis of co infected patient helping to institute early therapeutic management of such patient and increased survival rate.

Conclusion

The study showed that 22.2% of HIV infected persons had tuberculosis co-infection. More strategic preventive measures that enhance body immunity among HIV patients are highly needed as early as possible before they develop active tuberculosis

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