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PREVALENCE AND CLINICAL PROFILE OF CD4 COUNT OF HIV/TB CO-INFECTION AMONG PATIENTS ATTENDING ANTIRETROVIRAL THERAPY CENTRE AT A TERTIARY CARE HOSPITAL IN WESTERN UTTAR PRADESH (INDIA)

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ABSTRACT

Background: Tuberculosis (TB) is the most common serious opportunistic infection in HIV positive patients and is the manifestation of AIDS in more than 50% of cases in developing countries. The risk of developing tuberculosis (TB) is estimated to be between 26 and 31 times greater in people living with HIV than among those without HIV infection.[1] TB can occur at any time during the course of HIV infection. Aim: To describe the socio-demographic profile and prevalence of HIV/TB co-infection in HIV positive patients been attended at the antiretroviral therapy clinic (ART) centre at a tertiary care hospital associated LLRM Medical college Meerut of western Uttar Pradesh India. **Materials and Methods:** A cross-sectional study was carried out at the ART centre, Sardar Vallabh Bhai patel (SVBP), Hospital Meerut from Jan 2014 to Dec 2014. A total of 1034 HIV positive patients, who attended ART centre, receiving ART treatment during the study period, were included in the analysis. The statistical analysis was performed using SPSS software (Version 22.0). **Results:** This study showed 1034/161 (15.6%) prevalence of tuberculosis among HIV positive patients, of which 126 (78.3%) were males and 34 (21.1%) were females. Low CD4 count (< 50/µl) had statistically highly significant association with HIV/TB co-infection as compared to HIV infection only (P < 0.00001). **Conclusion:** The study showed that 15.6% 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: HIV-TB,HIV/AIDS,CD4 COUNT,ART CENTRE.

INTRODUCTION

The risk of developing tuberculosis (TB) is estimated to be between 26 and 31 times greater in people living with HIV (PLHIV) than among those without HIV infection. In 2013 there were 9 million new cases of TB, of which 1.1 million were among people living with HIV.[1] The adult HIV prevalence in India is estimated to be 0.27% translating into 2.1 million people living with HIV/AIDS (PLHIV) in 2011. This is third highest burden in the world. On the other hand, India is highest Tuberculosis (TB) burden country in the world with an estimated 2.2 million new TB cases occurring annually. While TB is commonest opportunistic infection (OI) in HIV infected individuals, HIV infection is an important risk factor for acquiring TB infection and its progression to active TB. HIV/TB together is a fatal combination with extremely high death rates (15 to 18%) reported among HIV infected TB cases notified under Revised National TB Control Program me (RNTCP). Overall, TB is estimated to cause about 25% of all deaths among PLHIV in India.[2]

TB was declared a global emergency in the year 1993; recently the Director General of WHO declared AIDS to be a global emergency as well. There exists a synergistic relationship between TB and HIV. The interface between TB and HIV is increased in countries like India where both TB and HIV infection are maximally prevalent in people of 15-49 years of age.[3] The association between HIV and tuberculosis present an immediate and grave public health and socioeconomic threat in developing countries.[4]

The implication of HIV infection is that it activates dormant tuberculosis to rapid disease progression of tuberculosis and death.[5] 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.[6] Reports show that active tuberculosis increases the morbidity and fatality of HIV-infected person and about one-third die of tuberculosis.[7]

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.[8] Hence, this study was conducted in order to assess the socio-demographic profile and the prevalence of tuberculosis among HIV positive patients who attended the ART centre at tertiary care teaching hospital of western Uttar Pradesh, India.

MATERIAL AND METHODS

A cross-sectional study was carried out at the ART centre, Sardar Vallabh Bhai patel (SVBP), Hospital Meerut, Uttar Pradesh from Jan 2014 to Dec 2014. S.V.B.P. Hospital is a tertiary level health care hospital associated as a teaching hospital of L.L.R.M. Medical College Meerut which is the only recognized govt medical college of Western Uttar Pradesh which covers the population from various adjacent district of Western Uttar Pradesh. A total of 1034 HIV positive patients, who attended ART centre, receiving ART treatment during the study period were included in the study.

A predesigned and pretested questionnaire was used to collect data on socio-demographic profile. Blood samples of these subjects were tested for HIV infection using highly specific enzyme-linked immunosorbent assay (ELISA) or Western Blot techniques. All the patients, irrespective of whether they had signs and symptoms of chest infection were screened for TB by chest X-ray and subsequently by repeated microscopic examination of sputum for acid fast bacillus (AFB) using standard technique. Those individuals who were positive for AFB in their sputum received standard directly observed therapy short-course as per revised national tuberculosis control programme of the Government of India.[9] Blood samples were collected periodically after obtaining written informed consent. Blood samples were processed for the CD4 count. Data collected was recorded on MS excel sheet and the statistical analysis was performed using SPSS software (Version 22.0). Chi-Square test was applied wherever needed. Socioeconomic status was assessed by the modified BG Prasad classification 2014.[10]

OBSERVATIONS

Socio-demographic characteristics

It was observed from Table 1 that, out of the 161 (15.6%) HIV/TB co-infection patients, 134 (83.3%) were in the age group of 20-49 years, followed by 19 (11.8%) in the age group of ≥50 years and only 8 (4.9 %) in the age group of less than 20 years. There were 126 (78.3%) male followed by 34 (21.1%) female and only 01 Transgender(0.6%). Among all 86(53.4) patients belonged to the OBC followed by 47(29.2%) from SC/ST caste, only 28(17.4%)

patients belonged to General caste. As per the modified BG Prasad classification, most of the patients 71 (44.1%) belonged to upper middle class followed by 51 (31.7%) lower middle class; while 36 (22.4%) from upper class. Education level of the study population indicated that 48 (29.8%) were illiterates and 66 (41.0%), 39 (24.2%) and 01 (0.6%) had education levels of secondary, primary and higher secondary, respectively. Only 7 (4.4%) were graduates. Occupation of the study population of HIV/TB co-infection showed that 69 (43.0%) were laborers, followed by 29(18.0%) housewife and 21(13.0%) were drivers. While 20(12.4%) were unemployed and percentage of both farmers and service class was same (6.8%) each.

Prevalence and Distribution of CD4 count of HIV and TB cases

Table 2 shows that out of the total 1034 HIV positive patients, who attended the ART clinic and received treatment, 161(15.6%) had HIV/TB co-infection and remaining 873 (84.4%) were HIV positive alone. It was also depicted that Low CD4 count (< 50/µl) had statistically highly significant association ($P < 0.00001$) with HIV/TB co-infection as compared to HIV infection only.

TABLE 1. Socio-Demographic Profile of patient's HIV-TB co infection

SOCIO-DEMOGRAPHIC PROFILE	N=161	PERCENTAGE (%)
AGE		
0-4	00	00
5-19	08	4.9
20-49	134	83.3
≥50	19	11.8
SEX		
MALE	126	78.3
FEMALE	34	21.1
TG	01	0.6
CASTE		
GENERAL	28	17.4
OBC	86	53.4
SC/ST	47	29.2
EDUCATION		
ILLITRATE	48	29.8
PRIMARY	39	24.2
SECONDRY	66	41.0
HIGHER SECONDRY	01	0.6
GRADUATE	07	4.4
OCCUPATION		
HOUSEWIFE	29	18.0
FARMER	11	6.8
DRIVER	21	13.0
LABOURER	69	43.0
SERVICE	11	6.8

UNEMPLOYED	20	12.4
SOCIO-ECONOMIC STATUS		
UPPER CLASS	36	22.4
UPPER MIDDLE	71	44.1
LOWER MIDDLE	51	31.7
UPPER LOWER	02	1.2
-LOWER CLASS	01	0.6

TABLE: 2 DISTRIBUTION OF PRE ART CD4 COUNT IN HIV AND HIV-TB COINFECTION

CD4 COUNT	HIV POSITIVE ONLY(%)	HIV –TB CO-INFECTION(%)	TOTAL
<50	53(67.0)	26(33.0)	79(7.6)
50-149	117(72.6)	44(27.3)	161(15.6)
150-250	146(83.4)	29(16.6)	175(16.9)
>250	557(89.9)	62(10.1)	619(59.9)
TOTAL	873(84.4)	161(15.6)	1034(100)

The chi-square statistic is 49.6637.df=3, The P-Value is < 0.00001.(highly significant).

TABLE: 3 DISTRIBUTION OF POST ART CD4 COUNT IN HIV AND HIV-TB COINFECTION

CD4 COUNT	HIV POSITIVE ONLY(N=873)	HIV –TB CO-INFECTION(N=161)	TOTAL
<50	51	22	73
50-149	102	27	129
150-250	135	59	194
>250	585	53	638
TOTAL	873	161	1034

DISCUSSION

The present study shows that out of the total 1034 HIV positive patients, who attended the ART centre and received treatment, 161(15.6%) had HIV/TB co-infection and remaining 873 (84.4%) were HIV positive alone. In a study done by **Purushottam A Giri** et al[11] at a tertiary level ART Clinic at western Maharashtra also depicts that out of the total 1012 HIV positive patients, who attended the ART clinic and received treatment, 172 (17%) had HIV/TB co-infection and remaining 480 (83%) were HIV positive alone. Similarly a study done by **Padyana *et al*.,**[12] at a tertiary care hospital of South India, among 200 HIV positive patients, showed that 54 (27%) patients had HIV/TB co-infection and remaining 146 (73%) were HIV positive alone. Another study done by **Kebede and Wabe**[13] in South West Ethiopia, among 296 patients on concomitant tuberculosis and antiretroviral therapy at hospital treatment center, of them only 24 (8.1%) were co-infected by HIV and TB. The

prevalence of HIV/TB co-infection is found 27.3% in another study done by **Dev *et al.*,**[14] in Kolkata.

HIV/TB together is a fatal combination with extremely high death rates (15 to 18%) reported among HIV infected TB cases notified under Revised National TB Control Program me (RNTCP).[2] The rates of HIV/TB co-infection have been reported to vary in different regions of India. It was found to be between 0.4% and 20.1% in north India.[15] However, the incidence was 3.2% in 1991, which increased to 20.1% in 1996 in south India.[16]

The present study also shows that Low CD4 count (< 50/µl) had statistically highly significant association ($P < 0.00001$) with HIV/TB co-infection as compared to HIV infection only .which is also found similar to other studies done by **Purushottam A Giri** et al[11] at ART clinic in western Maharashtra and **Padyana *et al.*,**[12] at a tertiary care hospital of South India.

Low CD4 cells in HIV-infected persons indicates severely depressed immunity that makes them susceptible to fresh TB infection or reactivation of latent infection and rapid degradation of clinical condition. It has already been established that TB attributed to a six-fold to seven-fold increase of viral load in HIV positive population.[17] Unlike cryptococcal meningitis or toxoplasmosis, which occur at very low CD4 counts, TB is unique in that it can occur over a wide range of CD4 counts, although it is more frequent at CD4 counts < 300 cells/µl. According to an estimate of World Health Organization, TB has become one of the leading causes of death among HIV-infected persons.[18]

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