RESEARCH ARTICLE

PREVALENCE OF HIV-TB CO-INFECTION, CLINICAL PROFILE AND CD4 COUNT OF HIV PATIENTS ATTENDING ART CENTRE OF AHMEDNAGAR, MAHARASHTRA

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ABSTRACT
Background: HIV-TB co-infection has become a major public health problem worldwide. TB has become the major cause of death in HIV positive patients. Clinical course and pattern of opportunistic infections in HIV patients is changing world-wide.
Aims & Objective: To study prevalence of HIV-TB co-infection and socio-demographic & clinical profile of HIV-AIDS patients attending anti-retroviral therapy (ART) centre in a rural area, Ahmednagar district of Maharashtra.
Materials and Methods: A cross-sectional study was conducted from November 2013 to April 2014 at an antiretroviral therapy centre of a rural tertiary care hospital, situated in Maharashtra state of India. Interview of 385 HIV positive individuals was taken by using pre-designed questionnaire which included socio-demographic and clinical profile, opportunistic infections and CD4 counts of the patients.
Results: More than two third (71.43%) of the study population were in sexually active age group i.e. 30-45 years. Females were 46.8% and males were 53.2%. Most of them were from upper lower socioeconomic (46.23%) and lower (secondary level) educational status. Fatigue, weight loss, fever, cough, diarrhoea were common clinical features. Most common opportunistic infection was herpes zoster (47.27%). Heterosexual route was main route of transmission. Most of the female respondents were widows (66.67%) and 48.29% were discordant couple. 46.75% patients were in the third stage of disease. Mean CD4 count at the start of treatment was 152.9 ± 92.45. Prevalence of HIV-TB co-infection was 21.56%.
Conclusion: Opportunistic infections were associated with CD4 count and CD4 count was associated with A.R.T. therapy. Primary as well as secondary preventive measures could be implemented effectively.
Key Words: Anti-Retroviral Therapy (ART); CD4 Cell; Co-infection; Education; Human Immunodeficiency Virus (HIV); Acquired Immunodeficiency Syndrome (AIDS); Tuberculosis (TB), Opportunistic Infection

Introduction

HIV/AIDS remains one of the world's most significant public health challenges, particularly in low and middle-income countries. There were approximately 35.3 million people living with HIV in 2012.[1] Among 35.3 million people living with HIV/AIDS (PLWHA) in 2012, 32.1 million were adults, 17.7 million were female and 3.3 million were children under 15 years of age. As the greatest killer worldwide due to a single infectious agent, TB is just the second to HIV/AIDS. People living with HIV and infected with TB are 30 times more likely to develop active TB disease than people without HIV.[1] HIV and TB form a lethal combination, each speeding the other's progress. In 2012 about 320,000 people died of HIV associated TB.[1]

As per World Health Organization (WHO) statistics for 2011, India is the highest TB burden country in the world with an estimated prevalence of 2.2 million cases of TB for India, out of a global incidence of 8.7 million cases.[2] Estimated new HIV infections was 0.116 million in 2011, and the estimated number of PLWHA was 2.08 million in 2011.[3] It is estimated that about 1.48 lakhs people died of AIDS-related causes in 2011 in India.[4] Maharashtra is high HIV prevalence state of India with estimated adult HIV prevalence of 0.42% 2011. It is estimated that Ahmednagar district has more than 20 thousand HIV affected people.[5]

Patients with relatively preserved immune function, with CD4+ T cell counts about 200 cells/µl are more likely to have typical symptoms like tuberculosis, candidiasis, herpes infections etc. The global impact of the converging dual epidemics of TB and HIV is one of the major public health challenges. The co-infection is increased in countries like India where both TB and HIV infection are maximally prevalent in people of 15-49 years of age. There was a need to study the profile of patients who come to anti-retroviral therapy (ART) centers and link their clinical and socio-demographic variables in the prevention of this disease. The present study aimed at identifying the prevalence of HIV/TB co-infection, socio-demographic characteristics and clinical presentations of HIV/AIDS patients, opportunistic infections and CD4 count at an ART center of a rural tertiary care hospital.

Materials and Methods

A cross-sectional study was carried out at an A.R.T. centre of a rural tertiary care hospital, situated in Ahmednagar district of Maharashtra state of India. The study period was from November 2013 to April, 2014. Study population included the patients who were visiting the ART center of Pravara Rural Hospital situated at Loni. Those who had CD4 count less than 350 cells/µl started ART after registration as on-ART patients at A.R.T. centre. These on-ART patients were the study population. Those patients who were below 15 years of age, pre-ART patients and those not willing to participate were in the exclusion group.

Before information collection, objectives of the study were explained. After assuring the confidentiality of the subjects, written consent was taken from them before interview, if they were co-operative for the study. Confidentiality and privacy were maintained during interview. A set of pretested questionnaire was used to interview 385 HIV/AIDS patients attending ART centers. Some of the information was collected from their cards as well. For Ethical consideration, the synopsis was approved by institutional research committee of Centre for Social Medicine (CSM) of Pravara Institute of Medical Sciences (PIMS). Questionnaire validation was done before conducting the study.

Statistical Analysis

Data coding and editing was done manually and entry was done in Microsoft excel 2007. Data analysis was done by SPSS software version 17. Means and standard deviations were calculated. Chi-square test was used to test the Statistical association of qualitative data and un-paired t-test was used to test the statistical association of quantitative data.

Results

Most of the HIV positive patients were in the age group 30-45 years (71.43%, n=275) which is sexually active group followed by 45-60 years (15.58 %, n=60). Mean age of the respondents was 39.397 ± 8.417 years. Gender-wise distribution was as follows: 53.2% male and remaining 46.8% female. Main occupation was farming (37.47%). 40% male and 34.44% female were in farming. The 32.22% of the female were house-wives and 16.1% of the males were drivers. The association between gender and occupation was statistically significant with the χ^2 value 101.84; degree of freedom (d.f.) 6 and p value <0.0001. However, the association between occupation and HIV-TB co-infection was not statistically significant (p value 0.8291). Most of the respondents were from upper lower socioeconomic status (46.23%) followed by lower middle class (23.64%). There was statistically significant association in between socio-economic status and HIV infection. Respondents having secondary level of education were (53.25%) followed by primary level of education (17.66%) and heterosexual route was the main route of HIV/AIDS transmission (94.03%).

Most common opportunistic infection in the study area was herpes zoster (47.27%) followed by tuberculosis (21.56%). Majority of the respondents were married (62.8%) - among them 90.73% of the male and only 29.44% of the female were having marital life. 32.99% of the respondents were widow/widowers (3.41% male and 66.67%female).The statistical association of HIV patients in between gender was significant with χ^2= 175.34, d.f. =3 and p < 0.0001.The sero-discordant couples (one partner of the couple is sero-positive for HIV infection while another is not) were 26.75% – among them, 48.29% were male patients as compare to 2.22% female. Tobacco was the most common substance used in rural area; 32.47% subjects gave the present history of tobacco chewing or cigarette smoking among them 82.4% were male and 17.6% were female. Alcohol abuse was seen in 9.87% subjects and 15.58% subjects gave past history of alcohol use. None of the female gave the history of alcohol use either in past or present.

Majority of the respondents were at the 3rd stage (46.75) of the disease (WHO clinical stages). The statistical association between gender and WHO clinical stage was highly significant with χ^2 value 37.716; d.f. 3 and p <0.0001. 76.59% of the male patients were having the history of high risk sexual behavior and only 1.11% of female patients were having this history. 39.21% of the respondents were travelling more than 30km to get the A.R.T. Zidovudine (AZT) + Lamivudine (3TC) + Nevirapine (NVP) was the most commonly used medicine (66.23%), in the fixed dose combination (ZLN) form. The CD4 count of the respondents at the initiation of ART therapy was always below 350, because the cutoff point was fixed at 350 cells/ µl. Most of them had CD4 count in the range of 50-150 cells/µl (36.88%) followed by 150-250 cells/µl by 30.38%. But, by the time of interview,the CD4 count of the patients was increased, and majority of them had >350cells/µl CD4 count (49.35%).

Table-1: Demographic characteristics

Characteristics		Male N (%)	Female N (%)	Total N (%)
Age (Years)	15-30	10 (4.88)	33 (18.33)	43 (11.17)
	30-45	144 (70.24)	131 (72.77)	275 (71.43)
	45-60	46 (22.44)	14 (7.78)	60 (15.58)
	>60	5 (2.44)	2 (1.11)	7 (1.82)
	Total	205 (100)	180 (100)	385 (100)
	χ^2 = 29.77; d.f. = 3; p<0.0001			
Occupation	Farming	82 (40)	62 (34.44)	144 (37.40)
	Housewife	0 (0)	58 (32.22)	58 (15.06)
	Service	31 (15.12)	19 (10.56)	50 (12.98)
	Business	32 (15.61)	15 (8.33)	47 (12.21)
	Labor	24 (11.7)	22 (12.22)	46 (11.95)
	Driver	33 (16.1)	0 (0)	33 (8.57)
	Student/no job	3 (0.97)	4 (2.22)	7 (1.82)
	Total	205 (100)	180 (100)	385 (100)
	χ^2 =101.84; d.f. 6; p <0.0001			
Socio-economic status	Lower	32 (15.61)	43 (23.89)	75 (19.48)
	Upper lower	86 (41.95)	92 (51.11)	178 (46.23)
	Lower middle	53 (25.85)	38 (21.11)	91 (23.64)
	Upper middle	25 (12.2)	5 (2.78)	30 (7.79)
	Upper	9 (4.39)	2 (1.11)	11 (2.86)
	Total	205 (100)	180 (100)	385 (100)
	χ^2 =20.293; d.f. =4; p = 0.0004			
Education	Illiterate	15 (7.32)	41 (22.77)	56 (14.55)
	Primary	35 (17.07)	33 (18.33)	68 (17.66)
	Secondary	119 (58.05)	86 (47.77)	205 (53.25)
	Higher education	36 (17.56)	20 (11.11)	56 (14.55)
	Total	205 (100)	180 (100)	385 (100)
	χ^2= 20.477; d.f. = 3; p =0.0001			
Marital Status	Married	186 (90.73)	53 (29.44)	239 (62.08)
	Widow/ widower	7 (3.41)	120 (66.67)	127 (32.99)
	Unmarried	10 (4.88)	5 (2.77)	15 (3.89)
	Divorced	2 (0.98)	2 (1.11)	4 (1.04)
	Total	205 (100)	180 (100)	385 (100)

Table-2: CD4 count and co-infections

CD4 count (initial)	Co-infections					
	TB	Herpes Zoster	Candi-diasis	Skin Infection	Diarrhoea	Total
<50	22	30	11	16	15	59 (15.32)
50-150	37	69	11	19	26	142 (36.88)
150-250	12	48	9	13	11	117 (30.38)
250-350	13	33	4	7	3	67 (17.40)
Total	83 (21.56%)	180 (47.21%)	35 (9.09%)	55 (14.55%)	55 (14.29%)	385 (100)
p value	0.0001	0.5125	0.0483	0.0338	0.0015	-

Table-3: Association between age, gender and CD4 counts

Variables		Mean	SD	t	p	Inferences
Age	Male	42.19	7.643	7.398	<0.0001	Highly Significant
	Female	36.21	8.143			
CD4	Male	143.473	97.662	2.146	0.0325	Significant
	Female	163.639	85.141			
Initial CD4	HIV-TB	125.4	94.25	3.111	0.002	Significant
	HIV	160.46	90.66			
CD4 During interview	HIV-TB	414.96	262.34	0.327	0.7428	Not Significant
	HIV	405	241.6			

The Mean CD4 count at initiation of the treatment was 152.9 ± 92.45. But at the time of interview, all patients under ART had the mean CD4 count 405.2± 253.4. The statistical association between CD4 count at initial stage and at the time of interview was highly significant (χ^2=295.8; d.f. 4 and p <0.0001). The prevalence of HIV-TB co-infection was 21.56%, mean CD4 count of the co-infected patient at the initiation of ART was 125.4±94.25 cells/µl. The mean CD4 count of HIV only patients was 160.46±90.66. At the time of interview, the CD4 count of co-infected patients was 414.96±262.34cells/µl. In the HIV only patients, mean CD4 count was 405.47±241.6. Co-infection was more prevalent among male (27.8%) as compare to female (14.44%). The association of CD4 counts in HIV-TB co-infected patients and HIV only patients was significant with the χ^2 value 19.696, d.f. 3 and p value 0.0002. The prevalence of herpes zoster in HIV patients was 47.21% followed by prevalence of skin co-infection at 14.55%. The prevalence of chronic diarrhea was 14.29%. The co-infections and CD4 count were statistically significant. There were significant associations in between Age, Gender and CD4 counts of the patients with occurrence of HIV-AIDS. (Table 3)

Discussion

In the present study, among the 385 HIV positive patients under ART therapy, most of them were from the age group 31-45 years (71.43%) who were in the economically productive and sexually active age group. HIV had a tremendous impact on the livelihood of the affected individual as well as their family members. Similar Study by Kamath et al (2013)[6] had reported that sexually active age group (31-45 years) was 61.3%. In the present study, mean age of the patients was 39.4 ± 8.42 years. Other studies by Kamath et al (2013)[6], Niraula et al (2013)[7], Ogbuinya et al (2014)[8], Mudda et al (2014)[9], Xavier et al (2013)[10], Singh et al (2013)[11] also had the similar findings.

The main occupation of the HIV/AIDS patients was farming {37.47% (40% of males and 34.44% of females)}, house wife (32.22%), drivers (16.1%), labor (11.95%). Singh et al (2013)[11] found that 18.18% were farmers (male 22.22% and female 6.89%) which was less than the present study. Truck Drivers were (43.20%) and housewife (75.86%) percentage was also different in that study.

In the present study most of the respondents were from upper lower socioeconomic status (46.23%) followed by lower middle class 23.64% and only 2.86% of the respondents were from upper class. Female percentage in upper class was very low. This was similar with the studies by Singh et al (2013)[11] who showed that 92.72% of the respondents were from low, 6.36% from middle and 0.90% from high socioeconomic class. Deshpande et al (2012)[12] also observed that majority of the

respondents were from lower middle socio-economic status (46.62%).

In the present study the main clinical feature complained by HIV patients were fatigue (75.06%), weight loss (72.46%), fever (68.57%), oral ulcers (32.47%). Diarrhoea was complained by 30.13%, night sweat by 27.01%, skin lesions by 22.85% and 21.04% of the respondents had genital ulcers. Niraula et al (2013)[7] found that 53.8% had fever, 46.5% experienced weight loss, 41% suffered from chronic diarrhea, 37.2% had cough, 23.6% used to get fatigue easily, 12.8% had oral lesions, 3.8% had genital lesions and 2.8% had night sweats. Other studies by Singh et al (2013)[11] and Rao et al (2012)[13] also had the similar findings.

Most common opportunistic infection in this study was herpes zoster (47.27%) followed by tuberculosis (21.56%), skin infection (14.55%) and chronic diarrhoea (14.29%). Saha et al (2011)[14] found that the common opportunistic infections were OC (53.43%), CD (47.05%), HSV-2 (36.76%), TB (35.29%), CMV (26.96%), HBV (15.19%) and HCV (7.35%). Njunda et al (2013)[15], Abdullah et al (2012)[16], Peterside et al (2011)[17] also had the similar findings.

Most of them had CD4 count in the range of 50-150 cells/µl (36.88%), followed by 150-250 cells/µl (30.38%) and 15.32% of the respondents had <50 cells/µl CD4 count. But at the time of interview; majority of them (49.35%) had >350cells/µl CD4 count followed by 22.08% having 250-350 cells/µl. The Mean CD4 count at the initiation of ART was 152.9±92.45 and at the time of interview was 405.2 ± 253.4. Kamath et al (2013)[6] found that at initial presentation, the mean CD4 count was 174.47cells/µl – following 6 months of treatment, which increased to 300.49 cells/µl.

In the present study, the prevalence of HIV-TB co-infection was 21.56%. Mean CD4 count of the co-infected patient at the initiation of ART was 125.4 ± 94.25 cells/µl, whereas mono-infected had it 160.46±90.66 cells/µl. At the time of interview, the CD4 count of co-infected patients was 414.96 ± 262.34cells/µl and mono-infected had 405.47±241.6. Kamath et al (2013)[6] reported that prevalence of HIV–TB co-infection was 18.86%. At initial presentation, the mean CD4 count was 174.47 cells/µl – following 6 months of treatment, which increased to 300.49 cells/µl. Other studies by Niraula et al (2013)[7] and Prabakaran et al (2013)[18] also had the similar findings.

This study was conducted at an ART centre of a rural tertiary care hospital in Maharashtra state of India. Therefore, caution needs to be taken to generalize the findings. Moreover, as this was a cross-sectional study, associations have been established among variables but not the casual inferences. A gap still exists between those who having HIV, detected as HIV-positives and those who report on ART centre.

Conclusion

The present study found that most of the HIV infected patients were from sexually active age group. Heterosexual route was the main route of transmission. Lower socioeconomic status and less educated patients were at more risk of HIV. The main clinical feature of HIV patients were fatigue, weight loss, fever, cough, oral ulcers, diarrhoea, genital ulcers etc. Herpes zoster was the commonest opportunistic infection followed by HIV-TB co-infection (21.56%). One third of the women were widow who lost their husband due to HIV/AIDS and showed more vulnerability of women to acquire HIV infection from their husbands. Intervention programs and services should be provided especially for women. ART was not easily accessible to all patients in rural area, so expansion of the ART is an urgent need. There was high rate of HIV-TB co-infection in male as compare to female, which may be due to over exposure of male patients to environmental risk factors. High risk and extra marital sexual behaviour were responsible factors for rapid HIV transmission. HAART should be started earlier to prevent opportunistic infections and to lengthen the life of PLWHA. Patients were transferred late to ART centre because of lack of diagnosis in early stage, so primary and secondary prevention should be taken together.

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