A Study on Socio-demographic Profile and CD4 Count of HIV Infected Patients Attending ART Centre RIMS, Ranchi

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Abstract :

Introduction : HIV infection is a global pandemic. It infects and destroys CD4 cells thus lowering the patient's immune response. Knowledge of CD4 count thus is important in management of HIV. The epidemiology of HIV should be understood especially with regard to various socio-demographic factors because the most effective approaches for its prevention and control are awareness and life style changes. **Objective :** 1) To describe socio-demographic profile of HIV-infected patients registered in ART centre RIMS, Ranchi. 2) To describe CD4 count in HIV-infected patients. **Method :** This was a cross sectional study conducted at ART centre, RIMS, Ranchi from July 2012 to October 2014. A total of 520 patients with age more than 15 years were selected by consecutive sampling method. **Statistical Analysis :** Template generated in MS excel sheet and analysis was done on SPSS software. **Results :** Out of total 520 HIV-infected patients, majority were male (56.0%, 291), married (78.5%, 408) and belonged to 31 to 45 years of age group (63.3%, 329). Majority (76.1%, 396) of the HIV-infected patients presented in WHO clinical stage I or II and less than half (46.2%, 240) were having CD4 count <200 cell/mm^3 when they were registered to the ART centre. **Conclusions :** HIV infection is more common in males in their most productive years of life. Increasing literacy alone can help in preventing the spread of HIV. Heterosexual route continues to be the most common mode of transmission of HIV. CD4 count is an important predictor in HIV cases.

Key words : HIV, CD4 count, ART centre.

Introduction :

Human Immunodeficiency Virus (HIV) infection has been recognized as one of the major public health problem all over the world especially in Sub Sahara Africa and South East Asia. AIDS, the Acquired Immuno Deficiency Syndrome, also called as 'slim disease', is a life threatening illness caused by HIV. It infects and destroys leukocytes that express the CD4 surface receptors. As a result, depletes its host of CD4 cells. [1,2] The CD4 cells play a central role in regulation of immune response [3] and low CD4 cell counts are associated with a greater risk of patients living with HIV developing opportunistic infections, which may then progress to advanced diseases and death. [4] Therefore, obtaining accurate and reliable measures of CD4 T cells are essential to assess and manage persons infected with HIV. [1]

HIV continues to be a major global public health issue, having claimed more than 39 million lives so far. In 2013, 1.5 million people died from HIV-related causes globally. It has been estimated that there were approximately 35.0 million people living with HIV at the end of 2013 with 2.1 million people becoming newly infected with HIV in 2013 globally. [5] Total number of HIV positive cases in India in 2011 was 2.09 million and death due to HIV was 1.47 lacs. The current HIV prevalence in India is 0.27%. [6]

Although Jharkhand is a low prevalence state for HIV/AIDS, its prevalence is showing an increasing trend. Due to migration, bridge population, low literacy, high risk group and other reasons, there is ample chance of spread of this dreaded disease. Number of people living with HIV/AIDS in Jharkhand in 2011 was 47976. Its prevalence in the state for the same year was 0.25% as compared to 0.14% in 2007. [6]

The epidemiology of the HIV infection in India is varied and depends on multitude of factors including geographic location, socio-demographic profile, behavioral profile etc. Epidemiological data on HIV with regards to socio-demographic factors as

well as risk behavior of the population in a specific region are important in providing vital information which may be used for effective control measures in that region. So there was a need to know the profile of HIV-infected patients who come to ART centre of RIMS.

Method :

This was a cross sectional study done at ART centre, RIMS, Ranchi which is the premier tertiary care institute of the state. A total of 520 HIV-infected patients with age more than 15 years were interviewed. Interview was conducted by using a pre-tested semi-structured questionnaire containing variables related to socio-demographic profile, behavioral history, risk factors for HIV etc. Information regarding clinical stage of HIV, CD4 count levels etc., were collected from the "Patient Treatment Record Card." Total duration of study was 28 months, from July 2012 to October 2014. The period of data collection was 7 months, from July 2013 to January 2014. During the period of data collection i.e. seven months, three HIV infected patents were selected by consecutive sampling method every working day till the sample size is reached.

Templates were generated in MS excel sheet and analysis was done on SPSS software. Informed verbal consent was taken and 520 patients were selected and interviewed during above said period. P-value <0.05 was considered as statistically significant.

The ethical approval was obtained from the Institutional Ethics Committee of RIMS, Ranchi and also from nodal officer of ART centre. To keep the confidentiality of the data and personal identity, name and address of the patients were not asked. Registration numbers of the patients were noted to avoid any repetitions. Later registration number of the patients were recoded and then entered in MS Excel sheet.

The participants were instructed of the right to, without further explanation, refuse to answer any questions. The patients' medical treatment was not affected, regardless of whether the patient chose to take part in the study or not.

Results :

The study was conducted with 520 HIV/AIDS patients. HIV-infection was found to be higher among males (56.0%, 291) than in females (44.0%, 229) with a Male: Female ratio of 1.27. The mean age of all HIV-infected patients was 37.95 years (SD=8.454) with male having mean age 39.79 years and female 35.61 years. Majority of HIV patients were in the

Table 1: Socio-demographic profile of HIV-infected patients (n=520)

Variables	Category	Number	Percentage
Sex	Male	291	56.0
	Female	229	44.0
Age	16-30	97	18.7
	31-45	329	63.3
	46-60	90	17.3
	More than 60	4	0.8
Religion	Hindu	374	71.9
	Muslim	45	8.7
	Christian	25	4.8
	Sarna	69	13.3
	Sikh	7	1.3
Residence	Urban	182	35.0
	Rural	338	65.0
Education	Illiterate	141	27.1
	Primary	121	23.3
	Secondary	167	32.1
	College and above	91	17.5
Occupation	Job (Govt./Private)	73	14.0
	Farming	36	6.9
	Self employed	79	15.2
	Daily wages	53	10.2
	Driver	49	9.4
	Sex worker	2	0.4
	House wife	179	34.4
	Student	3	0.6
	Jobless	46	8.8
Marital status	Married	408	78.5
	Unmarried	30	5.8
	Divorced/ Widowed/Widower	82	15.8
Type of family	Nuclear	367	70.6
	Joint	153	29.4
Socio-economic class (SEC)	Class I	27	5.2
	Class II	57	11.0
	Class III	69	13.3
	Class IV	153	29.4
	Class V	214	41.2

sexually active age group of 31-45 years (63.3%, 329), Hindu (71.9%, 374) and from rural area (65.0%, 338). Nearly half (50.4%, 262) were having up to primary level of education. It was observed that out of 520 HIV-infected patients, 179 (34.4%) were house wives, 79 (15.2%) were self-employed having their own business, 49 (9.4%) were drives, 53 (10.2%) worked on daily basis and 46 (8.8%) were jobless. There were 2 (0.4%) sex workers and 3 (0.6%) students. Majority of the HIV-infected patients were married (78.5%, 408), from nuclear family (70.6%, 367) and belonging to lower SEC i.e class IV and V of Revised Prasad's classification for 2014 (70.6%, 367). (Table: 1)

The most common mode of transmission of HIV was heterosexual route [474, (91.1%)] followed by blood transfusion [14, (2.7%)) and probable unsafe injection [5, (1%)]. There were 5 (1.0%) cases of MSM (Men having Sex with Men), 3 (0.6%) cases of injecting drug users and 1 (0.2%) case having mother to child transmission. In 18 (3.5%) patients the mode of transmission was unknown. (Table: 2)

Table 2 : Mode of transmission of HIV (n=520)

| Mode of transmission of HIV	Number	Percentage
Heterosexual	474	91.1
MSM	5	1.0
Injecting drug use	3	0.6
Blood transfusion	14	2.7
Probable unsafe injection	5	1.0
Unknown	18	3.5
Mother to child	1	0.2
Total	520	100

Majority (76.1%, 396) of the HIV-infected patients presented in WHO clinical stage I or II at the time of registration to the ART Centre. (Figure: 1)

Figure 1 : HIV clinical stage at the time of registration in ART centre (n=520)
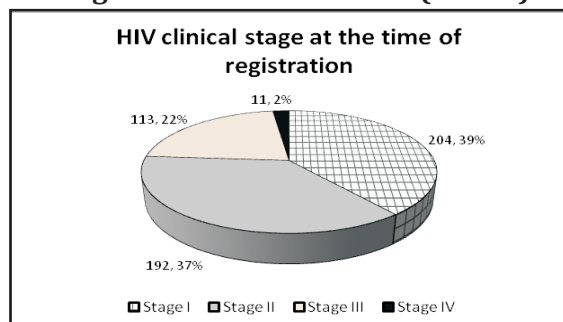
As far as CD4 count is concerned 240 (46.2%) patients were having CD4 count <200 cell/mm^3 when they were registered to the ART centre. 228 (43.8%) patients had CD4 count between 200-500 cell/mm^3 and only 52 (10%) presented with CD4 count >500 cell/mm^3 at the time of registration to ART centre. The mean CD4 count was 251.31 ± 178.663 cell/mm^3. (Figure: 2)

Figure 2 : CD4 count at the time of registration in ART centre (n=520)
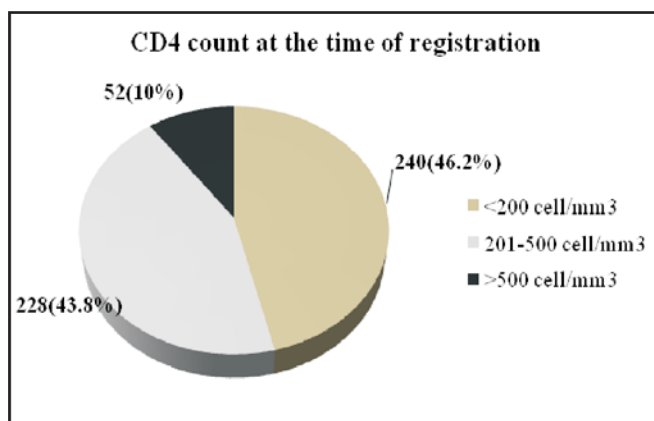
Mean CD4 count in female (293.03 cell/mm^3) was significantly higher than that of male (218.24 cell/mm^3) with p< 0.001. (Table: 3)

Table 3 : Comparison of CD4 count at the time of registration between male and female (n= 520)

Sex	Number	Mean CD4 count (cell/mm^3)	SD	Mean rank
Male	291	218.24	158.708	229.33
Female	229	293.03	193.023	300.11
Mann-Whitney U= 2.425E4		Z= -5.333		p< 0.001

In this study, a significant association was found between CD4 count and WHO clinical stage. HIV-infected patients with lower CD4 count at the time of registration were found to be associated with higher WHO clinical stage. This association was statistically significant with p-value <0.05. (Table: 4)

Table 4 : Association of WHO clinical stage with CD4 count at the time of registration in ART centre (n=520)

WHO clinical stage	CD4 count (cell/mm3)			Total
	<200	**200-500**	**>500**	
Stage I	53 (26.0%)	111 (54.4%)	40 (19.6%)	204 (100%)
Stage II	92 (47.9%)	90 (46.9%)	10 (5.2%)	192 (100%)
Stage III	85 (75.2%)	26 (23.0%)	2 (1.8%)	113 (100%)
Stage IV	10 (90.9%)	1 (9.0%)	0 (0%)	11 (100%)
Total	240(46.1%)	228 (43.8%)	52 (10.0%)	520 (100%)
χ^2 = 95.387, df =6, p-value < 0.001				

A significant association was found between age and CD4 count, age more than 45 years being associated with CD4 count <200 cell/mm^3 (p-value=.014). Similarly males were found to be significantly associated with lower CD4 count when compared to females (p-value<.001). 56.4% of the males were having CD4 count <200 cell/mm^3. No any significant association with other socio-demographic factors was seen with CD4 count. (Table: 5)

Table 5 : Association between socio-demographic profile and CD4 count (n=520)

Variables	CD4 Count (cells/mm3)				Chi Square Test
	<200	**200-500**	**>500**		
Age	16-30	31	56	13	Chi square=12.472
	31-45	156	140	33	df=4
	>45	53	35	6	p-value=0.014
Sex	Male	164 (56.4%)	108 (37.1%)	19 (6.5%)	Chi square=29.697
	Female	76 (33.2%)	120 (52.4%)	33 (14.4%)	df=2
					p-value<0.001
Residence	Urban	78 (42.9%)	89 (48.9%)	15 (8.2%)	Chi square=3.157
	Rural	162 (47.9)	139 (41.1)	37 (10.9)	df=2
					p-value=0.206
Education	Illiterate	70 (49.6%)	56 (39.7%)	15 (10.6%)	Chi square=2.179
	Primary	52 (43.0%)	56 (46.3%)	13 (10.7%)	df=6
	Secondary	78 (46.7%)	75 (44.9%)	14 (8.4%)	p-value=0.903
	College and above	40 (44.0%)	41 (45.1%)	10 (11.0%)	
Marital Status	Married	186 (45.6%)	181 (44.4%)	41 (10.1%)	Chi square=5.433
	Unmarried	14 (46.7%)	16 (53.3%)	0	df=4
	Divorced/Widowed/Widower	40 (48.8%)	31 (37.8%)	11 (13.4%)	p-value=0.246
Type of family	Nuclear	172 (46.9%)	156 (42.5%)	39 (10.6%)	Chi square=1.137
	Joint	68 (44.4%)	72 (47.1%)	13 (8.5%)	df=2
					p-value=.566
SEC	Class I	11 (40.7%)	16 (59.3%)	0	Chi square=8.447
	Class II	26 (45.6%)	28 (49.1%)	3 (5.3%)	df=8
	Class III	31 (44.9%)	31 (44.9%)	7 (10.1%)	p-value=0.391
	Class IV	70 (45.8%)	68 (44.4%)	15 (9.8%)	
	Class V	102 (47.7%)	85 (39.7%)	27 (12.6%)	

Discussion :

This study aimed at describing profile, WHO clinical stage, and CD4 count of all 520 HIV-infected patients registered in ART Centre, RIMS, Ranchi. The analysis of data of this study showed that male contributed to 56.0% of the case load in ART centre with 44.0% being the females. Figure for female is slightly higher than the national average of 39.07% [7] and study done by Kumar et al (38.5%).[8] Such a high proportion of infection rate in females is a cause for concern since this will lead to a proportionate increase in the children being infected due to transmission from mother to child. The male female ratio in our study is 1.27 which is lower than that found by study of Toshniwal et al [9], Kumar et al. [10]

In the present study, the predominant age group was 16-45 years, which is the sexually active and unfortunately also the economically most productive age group. The mean age of study subjects was 37.95±8.454 years. This is similar as reported from a study in Ahmedabad, India in 2010 wherein the mean age was 38.7 ± 10.3 years with the predominant age group being 15-44 years. [11] Vishal Chander also found mean age of HIV patients to be 37.22 years. [12] The educational status of HIV patients showed that the seropositivity was higher among the subjects with lesser education as almost half of the patients were found to be educated below primary level. These findings are similar to the study conducted by Jayant D in Maharashtra [13] and Jayaram et al. in Karnataka, India. [14] Low education status and less awareness regarding safe sex can be the reason for high prevalence among this group of people. However Cauldbeck et al observed no trends for education level with respect to the seropositivity. [15] Housewife comprised 34.4% of total HIV patients and 78.2% of total female patients. High percentage of housewives was found in other studies also. [16, 17] The reason for higher number of attendees being house wife can be gaining of infection by unsafe sex from their HIV positive husband or any other sexual partner.

Majority of the HIV patients in present study belonged to the lower socio-economic class i.e. class IV and V of Revised Prasad's Classification for 2014.

This is similar to the finding by Jayant D. [13] Upper SEC constituted only 5.2% of the total patients in the present study.

In this study the most common mode of acquiring HIV infection was found to be heterosexual route (91.9%). This is similar to the study by Jayant D. Deshpande (92.3%) and M.A.Khan (93.6%). [13, 18]

WHO clinical stage of the patients showed that more than 3/4th of total number of patients got registered in the ART centre in WHO clinical stage I & II, which is a sign of quality referral from ICTC and might be due to impact of large scale IEC campaigning at state and national level. However around 1/4th PLHIV (People Living with HIV) came late in the course of disease which could affect the effectiveness of ART drugs and treatment outcome. Another study by Hitenkumar P Sonani in Surat also found that maximum number of patients were in first or second stage when they first reported to ART centre. [19]

Analysis of CD4 count in this study revealed that mean CD4 count at the time of registration in ART centre was 251.31 cells/mm^3 (SD= 178.663). Less than half of the patients presented with CD4 count ≤ 200 cells/mm^3 which is lower than that found by Jayant D. Deshpande (61.99%). [13] Hitenkumar P Sonani in his study found that 55.8% patients were having CD4 cells count ≤ 250 cells/mm^3. [19]

In this study lower CD4 count was found to be significantly associated with higher WHO clinical stage (p-value <0.001). Bhandarkar et al reported similar results with a mean CD4+ count among HIV-infected patients being 270.63 cells. [20] It may be because lower CD4 count lowers the immunity further, which results in more clinical symptoms and thus higher WHO clinical stage.

Lower CD4 count was found to be significantly associated with higher age and male sex. Females tend to have higher CD4 count at the time of presentation to ART centre. This might be due to the fact that in a state like Jharkhand, females are generally infected with HIV by their husband. So there may be early reporting of female cases to ART centre if the husband is HIV positive.

Conclusion :

Most of the HIV affected population were in reproductive age group with male predominance indicating that this disease may cause a great loss to the nation's booming economy. Predominance of male cases may be due to their migration in search of work. Almost half of the HIV patients were found to be educated below primary level. Increasing literacy alone can help in better understanding about the disease, its mode of transmission, personal protective measures to be employed and societal responsibilities at the individual level, which will help to a great extent in preventing the spread of this pandemic. Marital life in female itself becomes a risk factor for those women who get infected by their HIV positive spouse. Most of the patients (91.9%) acquired HIV infection through heterosexual route. This is due to the fact that methods for protection from STI/HIV are not often used. It emphasizes the need to strengthen our Information Education & Communication (IEC) strategies to lower the burden of HIV/AIDS. More than $3/4^{th}$ of total number of patients got registered in the ART centre during the first and second stage of the disease which is a sign of quality referral from ICTC. Less than half of the patients presented with CD4 count ≤ 200 cells/mm^3. Significant association was found between CD4 count and WHO clinical stage (p-value <.005) indicating that lower CD4 count is associated with higher WHO clinical stage. Thus CD4 count continues to be an important indicator for HIV management. Higher age and male sex were found to be significantly associated with lower CD4 count.

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