EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 4
Issue: 8
727-730
Year: 2017

RELATIONSHIP BETWEEN CD4 T CELLS AND VIRAL LOAD AMONG HIV INFECTED PATIENTS AT TRIBHUVAN UNIVERSITY TEACHING HOSPITAL – A TERTIARY CARE HOSPITAL, NEPAL

Pramila K. C.*

Department of Pharmacy, Institute of Medicine, Tribhuvan University.

***Corresponding Author: Pramila K. C.**
Department of Pharmacy, Institute of Medicine, Tribhuvan University.

Article Received on 08/06/2017 **Article Revised on 28/06/2017** **Article Accepted on 18/07/2017**

ABSTRACT

Background: The purpose of this study was to analyze the relationship between CD4 T cells and HIV viral load among HIV infected patients at Tribhuvan University Teaching Hospital. **Methodology:** A hospital based retrospective study was carried out in 66 patients of age ≥18 years receiving ART from Tribhuvan University Teaching Hospital, Kathmandu, Nepal. Information was noted into data collection sheet such as demographic information and required laboratory outcomes (CD4 T cells and Viral load count). **Results:** The majority of patients were female (50%). The age group 28-37 years (37.9%) was the most infected group. There was not significant association between viral load and CD4 count at baseline ($p>0.05$) but had significant association at one year ($p<0.05$). **Conclusion:** The largest groups of infected patients were female. However it was almost equal. There was not significant relationship between reduced viral load and improved CD4 count at baseline but observed significance at one year.

KEYWORDS: Human immune deficiency virus, Antiretroviral Therapy (ART), CD4 count, viral load.

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) arose in 1981,[1,2] has killed numerous number of people due to wide spread of the disease and lack of medication to alleviate disease condition.[2] This disease is characterized by severe immunodeficiency and was extended around the world. Causative agent of this infectious disease is HIV- RNA that belongs to family retroviridae. Replication of HIV – RNA virus and destruction of CD4 lymphocyte are the characteristic feature of this disease.[1,3] Activation of immune is a hallmark of disease progression in HIV infection. Activation of systemic immune increases virus transcription and increase plasma virus consequently. Immune activation also cause increase an antigen level, antigens are the positive regulator of disease progression. Therefore, immune activation and patients having elevated viremia are at risk of CD4 T cell depletion. However, it is true that all HIV infected patients do not responds to the infection in the same manner.[4,5]

In Nepal, first isolation of HIV/AIDS was in 1988, since then this disease has became major public health concern.[6] According to World bank, because of different geographic distribution and various risk factor, HIV in Nepal is extremely heterogeneous.[7]

After development of Zidovudine (first ART for HIV/AIDS) in 1986**,** many newer drug such as NRTIs, NNRTIs and PIs were developed.[2] Though, none of them offer the complete treatment of the disease, disease condition moved to chronic state.[7] Although treatment for AIDS and HIV exit to decelerate the virus progressing, still there is not exact known cause.

MATERIALS AND METHODS

Study design: It is a retrospective study on HIV/AIDs patients over 2.5 years from April 2013. The data of HIV-infected patient's which available on ART centre of TUTH who received ART and having at least 3 CD4 T cells count report and 2 viral load report data was reviewed for adherence, CD4 T cells count and viral load in order to assess the CD4 T cells and viral load over one year of therapy during the period of survey. The information required for CD4 T cells count and viral load were recorded and these core indicators were evaluated based on following indicator.

Adherence CD4 T cells and viral load monitoring indicators

- Adherence report made at ART centre through recommended method such as self report was recorded.

- At the same period, various laboratory indicators like Viral load, CD4 T cells count, opportunistic infection were observed.
- Different type of treatment failures like clinical, immunologic and virologic (<400 copies/ml) recorded on the patient's data was recorded.

Type of study
Retrospective.

Study variables
Dependent variable
- Stage of infection and use of ARV drugs.
- Laboratory findings (CD4 T cells, viral load etc).
- Adherence to medication.

Independent variable
- Socio-demographic variables.
- Age, gender.

Study site and its Justification: This study was carried out at Tribhuvan University Teaching Hospital (TUTH), ART centre Kathmandu, Nepal. The study was carried out for six months.

Sampling Techniques: The sampling technique was purposive sampling. Data collection was done by the principal investigator and all those whom fall in the inclusion criteria was taken for the study during the data collection period.

Criteria for sample selection
Inclusion criteria: HIV/AIDS patients above 18 years of age taking Anti Retroviral therapy from April 2013 to November 2015.

Exclusion criteria: Pregnant women, Neonates and Children <18.

Collection tool: HIV related history contained data of patient and laboratory findings/data sheet by using questionnaire.

Plan for data management and analysis
Data entry, checking, compiling and editing was done manually and data analysis was done as per the objectives of the study. Data analysis was done 20.0 version of statistical package for social sciences (SPSS) software. The age and sex were shown in frequency and percentage. Relationship between CD4 T cell number and viral load was done by using chi- square test, p value <0.5 was considered at a level of significance.

Ethical consideration: Ethical clearance was taken from IOM, TUTH, MMC, Department of Pharmacy and Tribhuvan University Institute of Medicine Institutional Review Board, Maharajgunj, Kathmandu, Nepal**.**

RESULTS
Demographic studies
Table: 1. Demographic studies.

Characteristics	Frequency(N=66)	Percent%
Sex		
Male	32	48.5
Female	33	50.0
TG	1	1.5
Age group		
18-27	9	13.6
28-37	29	43.9
38-47	22	33.3
48-57	4	6.1
58-67	2	3.0

Out of 66 patients 48.5% were male whereas 50.0% were female and 1.5% was TG. Among these patients the greatest number of patients were in the age group of 28-37 i.e 43.9%, followed by age group 38-37 covered 33.3% of patients. Likewise, group of 18-27 years covers 13.6% patient. The least percentage 9.1% of patients were found above 48 years.

Relationship between baseline CD4 count and Viral Load
Table: 2. Association between baseline CD4 count and Viral Load

Characteristics		Viral load (copies/ml)		P value
CD4 count (cells/mm^3)	<400	400-10,000	>10,000	
0-100	5(7.6%)	2(3.0%)	2(3.0%)	
101-200	13(19.7%)	2(3.0%)	0(0.0%)	0.283
201-350	11(16.7%)	3(4.5%)	0(0.0%	
351-500	9(13.6%)	2(3.0%)	1(1.5%)	
>500	13(19.7%)	3(4.5%)	0(0.0%)	

Of 66, 7.6% patients had CD4 T cells 0-100, 19.7%, patients had 101-200, 16.7% had 201-350 and 33.3% had >350 CD4 count when viral load was <400 copies/ml. similarly, 6% patient had CD4 count 0-100, 3% had 101-200, 4.5% had 201-350.and 9% patient had CD4 count >350 when viral load was ≥400. It has p value 0.28.

Association between one year CD4 count and Viral Load

Table: 3. Association between one year CD4 count and Viral Load

Characteristics		Viral load (copies/ml)		P value
CD4 count(cell/mm^3)	<400	400-10,000	>10,000	
0-100	1(1.5%)	0(0.0%)	1(1.5%)	
101-200	7(10.6%)	1(1.5%)	0(0.0%)	0.000
201-350	14(21.2%)	0(0.0%)	0(0.0%)	
351-500	17(25.8%)	0(0.0%)	0(0.0%)	
>500	24(36.4%)	1(1.5%)	0(0.0%)	

Of 66 cases, 1.5% had CD4 T cells 0-100, 10.6%, patients had 101-200, 21.2% had 201-350, 62.2% had >350 CD4 count when viral load was <400 copies/ml. similarly, 1.5% patient had CD4 count 0-100, 1.5% had 101-200 and 1.5% had CD4 count >350 when viral load was ≥400. It has p value 0.000.

DISCUSSION

Gender distribution: The variation in gender among HIV infected patients is shown in Table 1. Though the majority of patients were female (50%), no vast difference was found between male and female. Our result was similar to the study of Gina M. Wingood et al, which predicted that number of male and female will be equal by the year 2000, Since women are the fastest growing gender with AIDs. Women are more liable to infect with HIV than men because the risk of acquiring HIV from a single act of intercourse is 8 times as high from men to women than women to men and another reason is female specific biological characteristics such as sex during menstruation, using oral contraceptive etc.[8,9]

Age distribution

The study of age distribution among HIV infected patients is shown in Table 1, in which greatest number of patients was of age group 28-37 years (43.9%). Though the age group division was not similar to that of study conducted by Mary B Cauldbeck et al which showed that 50% patients were age group 30-40.[10] However the finding of MARCIA G.ORY et al, revealed that younger people were more prone to infection than older people.[11]

Association between Viral Load and CD4 count over one year of therapy

The study of association between viral load and CD4 count are shown in Table 2 and 3.

Regarding the association between baseline CD4 count and viral load, 44% patients had CD4 count ≤350 while 33.3% had >350 CD4 count when viral load was <400 copies/ml. CD4 count ≤350 was observed in 13.5% while 9% patients had CD4 count >350 when viral load was ≥400. There was not significant relationship between CD4T cells count and viral load at baseline (p>0.05). Our result supported by the finding of John W. Mellors et al, suggested that the plasma viral load is not the better predictor of number of CD4T cells. However, their study indicated that greater the virus production higher the exhaustion of capacity of the immune system to recover CD4 T cells.[3]

At one year investigation, 33.3% patients had CD4 count ≤350 while 62.2% had >350 CD4 count when viral load was <400. CD4 count ≤350 was observed in 3% patients and 1.5% had >350 CD4 count when viral load was ≥400. Our study is in accordance with the finding of Leticia Eligio-Garcia et al, which showed that low viral load higher the CD4 counts.[1] Similarly, the finding of John W. Mellors et al, showed that the plasma viral load strongly predicts the CD4 T cells declining rate.[12] There is significant relationship between viral load and CD4 count at one year (p<0.05).

CONCLUSION

In this study, largest numbers of patients were female among which younger age groups were more prone to HIV infection falling under productive age groups which also affect country's economy. There was not significant relationship between viral load and CD4 cell count at baseline whereas significant association was observed at the time period of one year. Though these parameters are the crucial parameter for disease progression to AIDs and death of patients, CD4 T cells and viral load are not related which means these parameter does not affect the status of each other. Therefore, in conclusion, progression or worsening of disease condition may be due to solely among these two parameters or other factor such as opportunistic infections.

ACKNOWLEDGEMENT

Author wish to express my sincere gratitude towards Institute of Medicine, Tribhuvan University for providing the opportunity to conduct this research. I am grateful to Institutional Review Board (IRB) for approving the research topic. I also express my sincere gratitude to Tribhuvan University Teaching Hospital (Anti-retroviral Department) for providing the necessary materials and suitable environment for conducting the research.

REFERENCES

1. Eligio-GarcÃ-a, L., et al., Association of viral load and CD4+ count with infection of intestinal emerging parasites in HIV patients. Journal of AIDS and Clinical Research, **7**(12).
2. David R. Bangsberga, b., Edward P. Acostac, Reena Guptad,, E.D.R. David Guzmana, P. Richard

Harriganf,, and N.P.a.S.G. Deeksb, Adherence–resistance relationships for protease and non-nucleoside reverse transcriptase inhibitors explained by virological fitness, 2006; 20: 8.
3. Mellors, J.W., et al., Prognosis in HIV-1 infection predicted by the quantity of virus in plasma. SCIENCE-NEW YORK THEN WASHINGTON-, 1996; 1167-1169.
4. Leligdowicz, A., et al., Direct relationship between virus load and systemic immune activation in HIV-2 infection. The Journal of infectious diseases, 201(1): 114-122.
5. Sousa, A.E., et al., CD4 T cell depletion is linked directly to immune activation in the pathogenesis of HIV-1 and HIV-2 but only indirectly to the viral load. The Journal of Immunology, 2002; 169(6): 3400-3406.
6. Wasti, S.P., P. Simkhada, and E. Van Teijlingen, Antiretroviral treatment programmes in Nepal: problems and barriers. Kathmandu University Medical Journal, 2009; **7**(3): 306-314.
7. Shigdel, R., Factors associated with adherence to antiretroviral therapy in HIV-infected patients. A cross-sectional study in Kathmandu District, Nepal,
8. Padian, N.S., et al., Heterosexual transmission of human immunodeficiency virus (HIV) in northern California: results from a ten-year study. American journal of epidemiology, 1997; 146(4): 350-357.
9. Wingood, G.M. and R.J. DiClemente, Application of the theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women. Health education & behavior, 2000; 27(5): 539-565.
10. Cauldbeck, M.B., et al., Adherence to anti-retroviral therapy among HIV patients in Bangalore, India. AIDS research and therapy, 2009; 6(1): 7.
11. Ory, M.G. and K.A. Mack, Middle-aged and older people with AIDS: Trends in national surveillance rates, transmission routes, and risk factors. Research on Aging, 1998; 20(6): 653-664.
12. Mellors, J.W., et al., Plasma viral load and CD4+ lymphocytes as prognostic markers of HIV-1 infection. Annals of internal medicine, 1997; 126(12): 946-954.