

The impact of education, family income, and occupation on CD4 count among HIV infected adults

Sir,

Human immunodeficiency virus (HIV) infection has a major contribution toward overall venereal diseases in India.^[1] HIV primarily attacks CD4+ T-helper cells and diminishes the associated cellular immune response. The decrease in CD4 cell count provides an opportunity to various other infectious agents to attack HIV-infected individuals. The World Health Organization guidelines recommend that the antiretroviral therapy (ART) is to be initiated in adults infected with HIV when CD4 counts falls below 500 cells/ μ l or when the patient is symptomatic, while when CD4 cell count falls below 350 cells/ μ l, ART has to be initiated on priority basis.^[2] ART once started goes lifelong. HIV infection among different socioeconomic categories of individuals may have a different CD4 count attributed to differences in environmental, genetic, or nutritional factors. A study on HIV-infected adults based on socioeconomic condition is scarce from our country. Therefore, we tried to explore the association of socioeconomic condition with peripheral blood CD4 count among HIV-infected adults.

Newly diagnosed ART-naive HIV-infected individuals between 18 and 60 years of age group who visited our institute in between July 2011 and June 2015 ($N = 2869$) were assessed for their education, occupation, and family monthly income. Grading of occupation was done; Grade 1 occupation included professionals such as business, managers, doctors, engineers, chartered accountants, while Grade 4 occupation were farming, daily wage labor, driving, sweeping, attendants, etc.,. The peripheral blood sample was collected from the study population for biochemical, hematological, and immunological analysis. The absolute CD4 cell count was determined by BD FACS count CD4 reagent kit (BD Biosciences, San Jose, USA; Cat No. 342512). CD4 count of the study subjects was measured at baseline (before initiation of ART). Repeated CD4 count measurement was also done; however, since most individuals entered ART and follow-up data in hard copies where complex, we analyzed only single-point baseline (before initiation of ART) CD4 count. The data were statistically analyzed using GraphPad Prism 5 (GraphPad Software Inc. San Diego, California).

We found that individuals with lack of education, Grade 4 occupation, or family income below Rs. 15,000 per month were more likely to have CD4 count below 350 cells/ μ l than those having higher education, Grade 1 occupation, or family income above Rs. 30,000 per month, respectively (all $P < 0.0003$; Chi-square test). Individuals with higher education, Grade 1 occupation, or family income above Rs. 30,000 per month had a higher CD4 cell count by 45%, 58%, and 65% in comparison to those with lack of education, Grade 4 occupation, or family income below Rs. 15,000 per month, respectively [Table 1]. There was a strong association of lack of education with Grade 4 occupation and family income <250 USD/month (Rs. 15,000 per month) among ART-naive HIV-infected population ($P < 0.0001$; Chi-square test). Population with higher education had significantly higher family income, i.e., >500 USD/month (Rs. 30,000 per month) ($P < 0.0001$; Chi-square test).

Significant difference exists in CD4 cell count among higher socioeconomic conditions (i.e., higher education, Grade 1 occupation, and family income above Rs. 30,000 per month) and lower socioeconomic conditions (i.e., lack of education, Grade 4 occupation, and family income below Rs. 15,000 per month). However, a follow-up study from our country would be more informative regarding the propensity for opportunistic infections, progression to AIDS among the two groups. The lower socioeconomic population is infected by HIV at a disproportionately higher rate.^[3] This population may not have sufficient resources for a better nutrition which is necessary to boost CD4 count, and unhygienic living environment commonly observed among such population may further subsidize CD4 count.^[4] Although inadequate follow-up and social stigma may reduce adherence to HIV programs among people with a higher socioeconomic status, they maintain a higher CD4 count in comparison to people with a low socioeconomic status having inadequate follow-up and

Table 1: Socioeconomic status and baseline CD4 count of human immunodeficiency virus-infected individuals

Socioeconomic status (n)	Median CD4 count with IQR
Education	
Lack of education (196)	383 (154-753)
Primary education (2224)	276 (133-463)
Secondary education (188)	307 (153-488)
Higher education (46)	556 (396-725)
Monthly income	
<Rs. 15,000 (2358)	281 (136-481)
>Rs. 20,000 (187)	333 (160-518)
>Rs. 30,000 (11)	465 (363-688)
Occupation	
Grade 4 (1526)	240 (112-435)
Grade 1 (108)	381 (203-585)

IQR=Interquartile range

social stigma. Low educational levels can be significantly associated with AIDS progression.^[5] However, higher education can improve socioeconomic condition along with health by improving CD4 count among HIV-infected adults.

There is a need to identify and target the vulnerable group based on socioeconomic condition among HIV-infected adults. Although we have included ART naïve individuals, differences in accessibility and awareness about ART may be another reason for low CD4 count in those having lack of education and poor economic status and this can be addressed by an educational and financial intervention. In many countries, an adequate financial and educational intervention on HIV-infected adults with low socioeconomic condition has been implemented and it has successfully enhanced their CD4 count.

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Conflicts of interest

There are no conflicts of interest.

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