



## Original Research Article

# ABSOLUTE LYMPHOCYTE COUNT AS A PREDICTOR OF CD4 COUNT IN HIV-INFECTED PATIENTS ON TREATMENT

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**ABSTRACT**

**Background:** There exists literature that supports the positive correlation between the CD4+ count by flow cytometry and by TLC. However, some studies oppose this concept and correlations. Hence, there is a strong need to determine the correlation. **Objective:** The present study was undertaken to observe whether the absolute lymphocyte count can be used as a predictor of CD4 count in HIV-infected patients on treatment.

**Materials and Methods:** A total of 135 HIV positive individuals (diagnosis based on serology, PCR) were part of the study after obtaining written informed consent. The blood samples were collected as per standard protocol. Sysmex-K21 was used to assess the complete blood count and total leucocyte count. CD4+ count was performed using a flow cytometry device.

**Results:** A positive correlation was observed between the CD4+ count and WBC count, absolute lymphocyte count, and lymphocyte percentage.

**Conclusion:** The study results support that the absolute lymphocyte count predicts CD4 count in HIV-infected patients on treatment. However, further detailed studies with larger sample sizes and involving multiple centers are recommended.

**Keywords:** Absolute lymphocyte count, Immunity, HIV patients.

## INTRODUCTION

Measurement of the percentage and absolute count of CD4+ T cells has a prime importance in the prognosis of HIV-infected individuals.<sup>[1]</sup> This is used during the pre-treatment evaluation, initial assessments, post-treatment prognosis or treatment failures. It was reported that the ratio of CD4 and CD8 provides reliable information about HIV infection in both adults and infants. Hence the CD4/CD8 ratio can be considered as a marker for the assessment of HIV-infected patients.<sup>[2-4]</sup> Interestingly, CD4 cell count also influenced by various factors like age, gender, race etc. Hence, while management of the patients one has to consider this variation accordingly. It was reported that the CD4+ count is progressively reduced in the peripheral blood. Further, this decrease is seen in all the stages of disease. Though CD4+

count is a well-established biomarker, the high-cost and unavailability of test effects. There exists literature that supports the positive correlation between the CD4+ count by flow cytometry and by TLC. However, some studies oppose this concept and correlations.<sup>[5-7]</sup> Hence, there is a strong need to determine the correlation. The present study was undertaken to observe whether the absolute lymphocyte count is a predictor of CD4 count in HIV-infected patients on treatment.

**Objective:** The present study was undertaken to observe whether the absolute lymphocyte count as a predictor of CD4 count in HIV-infected patients on treatment.

## MATERIALS AND METHODS

The present study was a prospective study conducted from January 2023 to March 2023. A total of 135 HIV positive individuals (diagnosis based on serology, PCR) were part of the study after obtaining written informed consent. For the diagnosis standard protocol was followed as per NACO 2007 guidelines. The patients referred to the tertiary care hospitals during the study period were included. Patients with any severe complications were excluded from the study. Pregnant women were excluded from the study. The blood samples were collected as per standard protocol. Sysmex-K21 was used to assess the complete blood count. CD4+ count was performed using flow cytometry device. The institutional ethics committee approved the study protocol (LFMRC/EC/386-7/11).

**Statistical Analysis:** Data was analyzed by SPSS 27.0 version. Data was checked for quality control in

a spreadsheet and then expressed in mean and standard Deviation. The Pearson Correlation Coefficient was used to observe the correlation.

## RESULTS

The results were presented in Tables number 1 to 3. Table 1 presents the correlation between the study participants' CD4+ cell count and WBC count (n=135). There is a positive correlation between these parameters, which is statistically significant with  $P < 0.05$ . Table 2 presents the correlation between the study participants' CD4+ cell count and Absolute lymphocyte count (n=135). There is a positive correlation between these parameters, which is statistically significant with  $P < .00001$ . Table 3 presents the correlation between the study participants' CD4+ cell count and lymphocyte percentage (n=135).

**Table 1: Correlation between the CD4+ cell count and WBC count in the study participants (n=135)**

WBC count/ml	CD4+ cell count	R-value	P value
7250.45±2171.68	620.06±401.10	0.2817	0.000933*

\* $P < 0.05$  is significant

**Table 2: Correlation between the CD4+ cell count and Absolute lymphocyte count in the study participants (n=135)**

Absolute lymphocyte count/ml	CD4+ cell count	R-value	P value
2078.25±944.46	620.06±401.10	0.5973	< .00001*

\* $P$  value < .00001 is significant

**Table 3: Correlation between the CD4+ cell count and lymphocyte percentage in the study participants (n=135)**

lymphocyte percentage	CD4+ cell count	R-value	P value
30.56±27.6	620.06±401.10	0.3875	< .00001*

\* $P$  value < .00001 is significant

## DISCUSSION

The present study was undertaken to observe whether the absolute lymphocyte count is a predictor of CD4 count in HIV-infected patients on treatment. A positive correlation was observed between the CD4+ count and WBC count, absolute lymphocyte count, and lymphocyte percentage. It is known that there will be a drastic decline in the CD4 cell count in the patients infected with HIV. So, measuring these cells is a standard method for evaluation and monitoring. However, this is expensive and needs highly sophisticated instruments and expertise. Hence, there is a search for alternative and equally important methods that can also properly monitor these patients. As per the recommendations of WHO, the lymphocyte count of less than 1000-1200 cells/cumm is an alternative to the CD4 cell count.<sup>[8-10]</sup> There exist multiple studies which have studied the correlation between the lymphocyte count of less than 200 cells/cumm of blood and the CD4 cell count.<sup>[11-14]</sup> Our study results are as per the WHO recommendations. Some studies reported that the sensitivity is less for the count less than 1200. At the same time, other studies reported higher sensitivity and specificity to the count less than 200. It was

suggested that the cut-off of absolute lymphocyte count should be less than 200 instead of less than 1200.<sup>[15]</sup> Few studies reported that the leucocyte count was correlated but it was mainly significant in the children age group rather than in adults.<sup>[16]</sup> The study results support that the absolute lymphocyte count predicts CD4 count in HIV-infected patients on treatment. However, further detailed studies with larger sample sizes and multiple centers are recommended.

**Limitations:** The sample size of the study is small. Hence, the results cannot be generalized.

## CONCLUSION

The study results support that the absolute lymphocyte count predicts CD4 count in HIV-infected patients on treatments. However, further detailed studies with larger sample sizes and multiple centers are recommended.

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