



Center for Tropical Medicine  
Universitas Gadjah Mada

# Predictors of CD4+ T-Cell Increased Within 24 Months of ART Among ART Naïve Patients in Yogyakarta, Indonesia

## Authors:

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## INTRODUCTION

The number of people living with HIV (PLHIV) is increasing every year in Indonesia, increasing the number of people requiring antiretroviral Treatment (ART).<sup>(1,2)</sup> CD4+ T-cell count is used to monitor treatment response as viral load measurement is currently not readily available.<sup>(3)</sup> Information about factors associated with increase of CD4+ T-cell count in people on ART is limited, particularly in Yogyakarta. This study was conducted to identify factors predicting successful response to ART in PLHIV.

## METHODS:

- A retrospective observational cohort study was conducted among ART-naïve patients aged ≥18yrs who started treatment during January 2008–December 2012 in a public teaching hospital, Dr.Sardjito Hospital, Yogyakarta.
- Data was extracted from Antiretroviral (ARV) register at Edelweiss Clinic in Dr.Sardjito Hospital, with further information collected from hospital medical record.
- Outcome of interest was achieving CD4+ count >350 cells/mm<sup>3</sup> within 24 months of initiating ART.
- Analysis was performed using Kaplan Meier survival analysis to estimate cumulative incidence and Cox Proportional hazard model to determine predictors.

### Selection of the sample for analysis

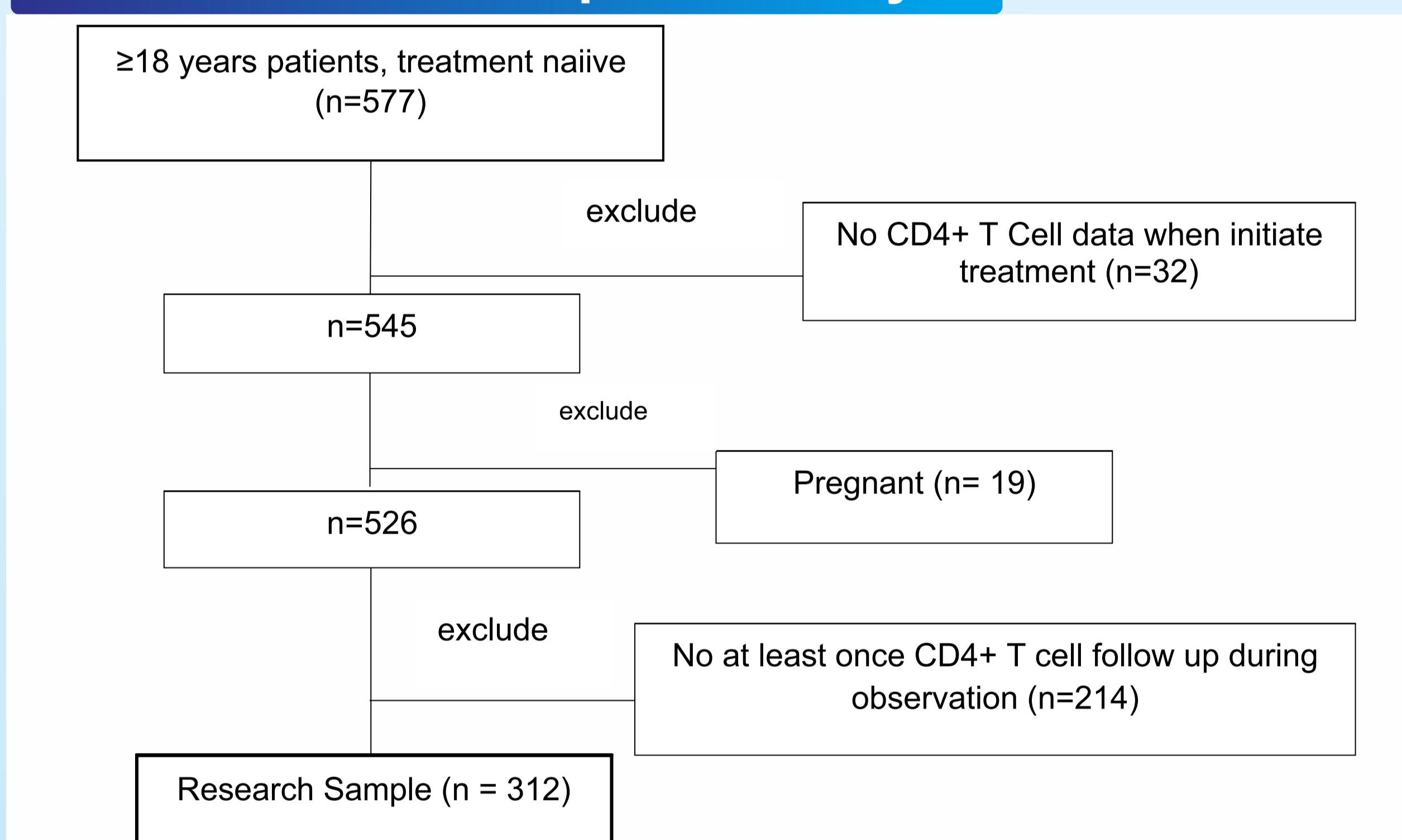


Figure 1. Sample Selection

## RESULT

### Patient's characteristic

Of 312 patients, 41.7% were in the age group of 29–39 years and 64.4% were men. Most of the patients (66.4%) had middle education. About 49.4% were married and heterosexual exposure was the largest risk group (56.7%). Fifty percent were at clinical stage 3 and 4. Seventy nine point two percent did not have TB infection. The median CD4+ T cell count was 52.5 cell/mm<sup>3</sup> and the count for most of the patients (48.4%) was 1-<50 cells/mm<sup>3</sup>. Sixty percent of the patients had anemia.

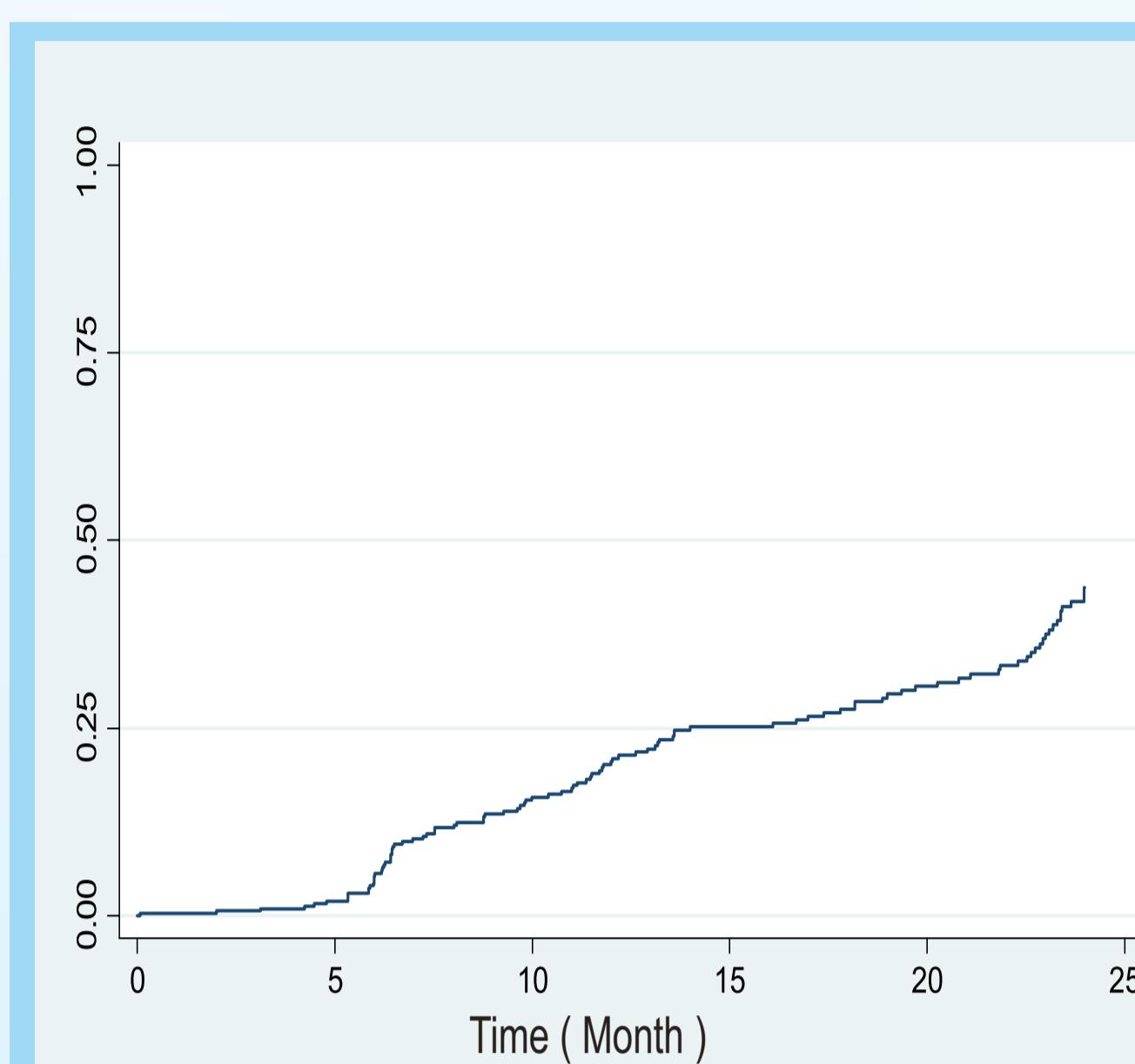


Figure 2. Kaplan Meier Curve

Table 1. Univariate and multivariate analysis

Variable	Crude Hazard Ratio (95% CI)	P value	Adjusted Hazard Ratio (95% CI)	P value
<b>HIV Risk Group</b>		0.019		0.984
Heterosexual	1		1	
Homosexual	1.88 (1.10-3.21)		1.01 (0.58-1.77)	
IDU	0.65 (0.36-1.17)		0.89 (0.49-1.64)	
Missing	1.30 (074-2.27)		1.02 (0.57-1.81)	
<b>Clinical Stage</b>		0.012		0.829
Stage 1	1		1	
Stage 2	0.54 (0.29-0.98)		1.76 (0.41-1.41)	
Stage 3 and 4	0.42 (0.23-0.77)		0.95 (0.49-1.81)	
<b>Baseline CD4+ T cell (cell/mm<sup>3</sup>)</b>		< 0.001		< 0.001
1 - <50	1		1	
50 - < 200	2.15(1.31-3.53)		2.19 (1.29-3.71)	
200 - ≤ 350	8.81(5.26-14.75)		8.98 (4.93-16.34)	

### Survival Analysis (figure 2)

- 32.4% reached CD4+ T cell increase to >350 cells/mm<sup>3</sup> within 24 months observation period
- 25% of patients reached CD4+ T cell count of >350 cells/mm<sup>3</sup> by month 14.
- By the end of 24 month observation period, 249 (79.8%) participants were still alive, 11 (3.5%) participants had died, 33 (10.6%) participants were lost to follow up, 19 participants (6.1%) were transferred out of hospital.

### Predictors of CD4+ T Cell Increase

- Higher CD4+ T cell count at baseline was the only predictor significantly associated with the increase of CD4+ T cell count to >350 cells/mm<sup>3</sup> within 24 months on ART both in the univariate and multivariate analysis( $p<0.001$ ).
- As shown in Table1, patients with CD4+ T cell count greater than 50cells/mm<sup>3</sup> at baseline were more likely to achieve a cell count greater than 350 cells/mm<sup>3</sup>within 24 months of starting ART. We observed a non-significant trend that MSM were more likely to reach a higher CD4 + T cell count following treatment, possibly related to earlier diagnosis and higher baseline CD4 + T cell count.

## CONCLUSION

- This study found that CD4+ T cell count at baseline is associated with the immunological response following ART initiation. This is consistent with previous findings, although several other factors have also been found to be associated in previous studies. One of these factors is treatment adherence (4,5), however we were unable to look at this in the current analysis.
- Starting ART with a higher baseline CD4 count is associated with faster recovery of CD4 count, therefore it is important to start treatment as soon as possible following infection. Programs to improve access for early diagnosis and early ART should be initiated with HIV-related providers involved in HIV control in Indonesia to improve outcomes for PLHIV, in both high risk groups and the general population. Effective collaborations among providers should be enhanced to expand those access for people.

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