

# Analisis Generalized Estimating Equations (GEE) untuk Menilai Perubahan Jumlah Limfosit-CD4 pada Injecting Drug Users (IDU) dan Non-IDU Penderita HIV/AIDS di Klinik Teratai RSUP Dr. Hasan Sadikin Bandung Tahun 2007-2009 = Generalized Estimating Equations (GEE) Modelling to Evaluate the Increase of Lymphocyte-CD4 among Injecting Drug Users (IDU), and Non-IDU with HIV/ AIDS

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## Abstrak

Jumlah penderita HIV/AIDS semakin bertambah di Indonesia. Anti Retroviral Therapy (ART) dapat meningkatkan kualitas hidup penderita, karena dapat memperbaiki status imunitas yang ditandai dengan kenaikan limfosit-CD4.

Tujuan penelitian: menilai peningkatan CD4 dan faktor-faktor yang mempengaruhinya pada Injecting Drug Users (IDU) dan non-IDU penderita HIV/AIDS. Penelitian menggunakan data sekunder Klinik Teratai RSUP Dr.Hasan Sadikin Bandung, tahun 2007-2009. Data lengkap berasal dari 198 subjek (161 IDU, 37 non-IDU). Data dianalisis dengan Chi-square test, Fisher's exact test, General linear model (GLM) dan Generalized estimating equations (GEE). Analisis GEE memungkinkan evaluasi peningkatan CD4 pada pengukuran berulang pada kelompok kohort yang mendapat ART.

Hasil penelitian: secara keseluruhan antara kelompok IDU dan non-IDU (between group) perbedaan peningkatan CD4 tidak bermakna ( $P=0,230$ ); pada Fase II (bulan ke 6-12) peningkatannya berbeda bermakna ( $P=0,016$ ); dibandingkan Fase I (bulan ke 0-6) yang tidak berbeda bermakna ( $P=0,077$ ). Faktor-faktor: Waktu, total lymphocyte count (TLC) dan CD4-awal berpengaruh bermakna; sedangkan umur, IDU, viral load (VL), body mass index (BMI), Hemoglobin, ko-infeksi Hepatitis B dan/C, Pengobatan Tuberkulosis dan Stadium HIV merupakan perancu (konfounder). Jenis kelamin pengaruhnya tidak bermakna.

Saran: penelitian dilanjutkan dengan penambahan jumlah subjek Non-IDU, waktu pengamatan sampai 3 tahun untuk melihat pengaruh jangka panjang ART, serta menambah upaya menghentikan penggunaan narkoba suntik.

.....New cases of HIV/AIDS infection are still increased in Indonesia nowadays. Anti Retroviral Therapy (ART) can give better quality of life for HIV/AIDS patients by improving the immune status which can be detected by the increase of CD4 count.

The aim of this study was to evaluate the increase of CD4, and factors which influence it, between Injecting Drug Users (IDU) and non-IDU with HIV/AIDS infection. This study used secondary data from Klinik Teratai RSUP Dr.Hasan Sadikin Bandung at 2007-2009. Complete data was taken from 198 subjects (161 IDUs, and 37 Non-IDUs). Data was analyzed by Chi-square test, Fisher's exact test, General linear model (GLM), and Generalized estimating equations (GEE); GEE provides an analysis of repeated measures of outcomes from these ART cohort groups.

Results: overall, between IDUs and non-IDUs, there was insignificant CD4 increase ( $Pvalue = 0,230$ ). Non-IDUs showed better CD4 increase; the difference was statistically significant in Phase II (0-6th month) with  $Pvalue = 0.016$ , but not significant in Phase I (6-12th month) with  $Pvalue = 0.077$ . Factors that significantly

influenced CD4 increase were Time, total lymphocyte count (TLC), and baseline CD4; whereas Age, IDU, viral load (VL), Hemoglobine, body mass index (BMI), Hepatitis B and/C co-infections, Tuberculous therapy, HIV-stages were roled as confounders. Gender did not give any influence.

Further study was needed with equal subject numbers of Non-IDU, longer observation time up to 3 years to observe long-term effect of ART, and more efforts in reducing numbers of IDUs.