Application of Growth Model Techniques to Study the ART Treatment Progression and to Study the Mortality Pattern of HIV Infected Patients using CEPAC Database

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Objective: *To identify the growth model for viral load with respect to CD4 count and to monitor the mortality pattern of HIV disease through control charts.*

Methods: *A retrospective analysis of 588 patients receiving care at VHS - Infectious diseases Medical Centre, a tertiary HIV referral center in southern India, during the period of 2007 through 2017. MANOVA was performed to determine the growth model of viral load with respect to CD4 count. Fitting of probability distribution has been performed to CD4 count to find the best fit among Weibull, lognormal and exponential distributions. Control charts were drawn to monitor the mortality pattern of HIV infection.*

Results: *The median age of the study subjects at the time of HIV diagnosis was 35 years (range 4 -75 years), and the median CD4 count at the baseline was 251 cells/µL. Pulmonary tuberculosis (21.2%) was the most common AIDS-defining illness observed in this cohort. The CD4 count has a significant influence on both the viral load (p=0.011) and gender (p<0.001). Though the range of CD4 count is in good interval, patients die due to the occurrence of pulmonary tuberculosis and Cardio respiratory failure. Fitting of probability distribution resulted as a best fit in Weibull distribution for CD4 count.*

Conclusion: *ART is recommended for all HIV-infected individuals, regardless of CD4 count, to reduce the morbidity and mortality associated with HIV infection. Patients are recommended to follow up the treatment regularly so as to prevent the opportunistic infections, which leads to death earlier.*

Keywords: *HIV- Human immunodeficiency Virus ART - Antiretroviral therapy, MANOVA-Multivariate Analysis of Variance, AIDS - Acquire Immuno deficiency syndrome.*