

Modelling the effects of alcohol on HIV- infected patients on highly active: antiretroviral therapy (HAART)

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Master of Science (Mathematical Modelling)

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HIV/AIDS continues to spread around the world and the use of alcohol has also increased, in particular in the developing countries. Substance abuse such as drug and alcohol is a major contributing factor to poor HAART adherence. risk for drug interactions and increase of side effects on HIV-infections patients. In the present study we formulate and analyse HIV/AIDS mathematical models with cellular-mediated immune responses for assessing the effects of alcohol on HAART among HIV/AIDS patient alcohol users. The models assume that the CD4+T cells population is divided into susceptible, infected, HIV infectious free virus, and the fourth class is a result of the use of PI. Two HIV pre-treatment and treatment models are first considered and analysed. In all cases the equilibrium points of the non-linear systems are found; the threshold disease parameters are computed which show that if the reproduction number is less than unit, the disease will die out and, if it is greater than unit, the disease persists. Stability of equilibrium points (both local and global) of disease-free and the endemic equilibrium are investigated using various techniques. To assess the impact of alcohol on HAART, sensitivity analysis the key parameters that drive the disease progression are carried out. Numerical simulations show that the immunological and biological responses are less pronounced when HAART is taken together with alcohol. Alcohol affects adherence may be through decisions to forgo HAART when drinking and may be not through or through drunkenness and forgetfulness. The inefficiency of treatment due to alcohol is most evident when it is administered as monotherapy or a combination of any FI or RI with PI drugs compared when HAART is administered. Therefore this study recommends the acquisition of more HAART (drugs encouragement of HIV patients to adhere to treatment and not to take alcohol. In addition, National government should limit advertising and promotion of alcohol use in the same way the Airlines limited tobacco use.