Abstract

HIV/AIDS remains one of the leading causes of death in the world with its effects most devastating in Sub Saharan Africa due to its dual infection with opportunistic infections especially malaria and tuberculosis. This study presents a co infection deterministic model defined by a system of ordinary differential equations for HIV/AIDS, malaria and tuberculosis. The HIV/AIDS only model is analyzed to determine the conditions for the stability of the equilibria points and assess the role of treatment and counseling in controlling the spread of the infections. This study shows that effective counseling reduces the value of the reproduction number for HIV/AIDS (RH) to less than unity eliminating the HIV/AIDS problem. Numerical simulations show that applying anti-retroviral treatment (ARV'S) without effective counseling increases the value of RH, worsening the HIV/AIDS problem, however ARV treatment coupled with effective counseling reduces the value of RH to a level below one eliminating the disease. The study further shows that when the proportion of those receiving ARV treatment without effective counseling increases, the value of RH also increases to a level above one, however effective counseling maintains the value of RH below unity therefore strategies for the control of HIV/AIDS should emphasize counseling and not only treatment.