

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 malaria co infection sub 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 treatment of malaria alone even in the absence of HIV/AIDS, may not eliminate malaria from the community therefore strategies for the reduction of malaria infections in humans should not only target malaria treatment but also the reduction of mosquito biting rate. The study showed that counseling is the most sensitive parameter in the spread of HIV/AIDS-malaria co infections, therefore effective counseling strategy is very useful in controlling the spread of the HIV/AIDS and malaria co infections. The study further showed that ARV treatment and counseling for HIV/AIDS infectives have no effect on the spread of malaria. Finally the HIV/AIDS malaria model undergoes backward bifurcation which is favoured by the occurrence of high mosquito biting rate.