Abstract

To date, HIV/AIDS has remained the most widespread viral STD with no cure and the leading cause of death. All what is available are viral load control regimen and treatment of opportunistic diseases. The highly advocated control measure remains as Abstinence, Being faithful and use of Condom, popularly denoted as (ABC) method. The ABC control measures relate directly to individual behavior, and the success depends on individual commitment and self-discipline. However, environmental and cultural practices have for a long time been blamed for observed high levels of prevalence, especially among the fisher folk community. In this paper, we consider the interaction dynamics of sub communities, their coupling strength viz a viz transmission rates and propose optimally strategies of curbing the pandemic. A mathematical compartmental model is formulated using ODE's for the distinct disease characteristic classes, then coupled via transmission rates and analyzed for the effect of disease control parameters. It was found that there exist a stable, positive and bounded invariant manifold, characterized by disease free equilibrium and endemic equilibrium points. Using data collected from Fisher folk around Lake Victoria region in Kenya, the equilibrium state is found to have a reproductive ratio of and . Control strategies studied include treatment, public health education campaign to reduce sexual partners and reduce recruitment to high risk class and reduce infectivity rate through the use of abstinence, contraceptives or being faithful. It was found that the optimal control values to reduce the vector population reproductive ratio to values less than one are; and . The achievement of these however depends on the budgetary allocation, which was not considered in this paper