The HIV-HCV co-infection dynamics in absence of therapy

Mayanja Edison, Livingstone S. Luboobi , Juma Kasozi and Rebecca Nsubuga,
Department of mathematics Makerere University, Uganda.

Institute of Mathematical Sciences, Strathmore University, Nairobi, Kenya.
Uganda Virus Research Institute and London School of Hygiene and Tropical Medicine, Uganda.

HIV-HCV co-infection is whereby an individual is infected with both viruses HIV and HCV. Globally, approximately 4 to 5 million people are co-infected with HIV and HCV. HCV infection significantly causes morbidity and mortality among HIV patients. HCV is known to progress faster and cause more liver-related health problems and death among people who are HIV/AIDS positive than those who are negative. Co-infection with HCV complicates the management of HIV/AIDS. Mathematical modeling generally provides an explicit framework by which we can develop and communicate an understanding of transmission dynamics of an infectious disease. In this article, a deterministic model is used in which ordinary differential equations are formulated and analyzed to study the HIV-HCV co-infection dynamics in absence of therapy. The findings reveal that the basic reproduction number for HIV-HCV co infection dynamics is equal to the maximum of single-disease basic reproduction numbers. This implies that the dynamics of the HIV-HCV co-infection will be dominated by the disease with the bigger basic reproduction number.

Keywords: HIV-HCV; cc-infection; basic reproduction number.