Mathematical Modelling of Onchocerciasis Transmission Potentials of Female Blackflies in Hyper-Endemic Communities after a Decade Annual Ivermectin Treatment

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Hyper-Endemic communities are the major focus for the elimination of Onchocerciasis disease. This has been one of the major public health problems in tropical countries. In this paper, an SI (Susceptible - Infectious) and SIRS (Susceptible - Infectious - Recovered - Susceptible) compartmental model that estimates the Onchocerciasis transmission potentials of female blackflies in hyper-endemic communities after a decade long annual ivermectin treatment are proposed and analyzed. The data collected from the identified hyper-endemic communities in Imo and Abia State Nigeria, that shows the status of Onchocerciasis in some pre-community directed treatment with ivermectin (1994) hyper-endemic communities located in the Imo River Basin transmission foci of Onchocerciasis were analyzed. We show that the threshold that determines the stability of the equilibrium is the ivermectin administration reproduction number, which incorporates the female blackflies and humans living in hyper-endemic communities. The numerical results are presented and are found to be in agreement to the real life situation data.