Control Malaria through media Awareness: A Mathematical Modeling Approach

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Abstract

Malaria is an ancient disease with challenging health issues. The tropical regions such as Africa, Asia and America are favorable for rapid spread of this disease. There are two hundred and twenty five million cases of malaria around the world. This deadly disease is the root cause of the death of around millions people according to the world health organization (WHO) 2013 world malaria report. The literature on the mathematical model for vector-borne disease likewise malaria is vast. The mathematical modeling of malaria disease has a crucial role to understand the insights of the transmission dynamics and corresponding appropriate prevention strategies. In this study, a deterministic Vector-borne model has been proposed. Previous studies suggested that prevention is a control parameter for such infectious disease. Thus it shall be helpful to add awareness term in mathematical model of the disease. The whole infected host population is divided into two groups, aware and unaware infected individuals. The positivity and the boundedness of solutions have been derived. Local and global stability analysis of disease free equilibrium has been investigated via basic reproductive number R_0, if $R_0 < 1$ the system is stable otherwise unstable. The existence of the unique endemic equilibrium has been also determined under certain conditions. The results show that a significant increase in the population of susceptible human is achieved in addition to the decrease in the population of the infected mosquitoes.