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INVESTIGATING THE TRANSMISSION DYNAMICS OF THE EBOLA VIRUS AND STRATEGIES TO CONTROL THE SPREADING OF THE EBOLA VIRUS

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Abstract

Ebola is a contagious disease which has had sporadic outbreaks since 1976 particularly in Central Africa resulting in fatality rates of between 50 to 90 percent. Cases of Ebola outbreaks have been reported in Sudan, DRC AND Uganda in Africa. The cure for the disease has not yet been found and therefore Ebola patients only receive supportive therapy. This paper looks at the transmission dynamics of the disease and the different intervention strategies that can be used to control Ebola in the event of an outbreak. Numerical simulations were conducted to look at changes in the susceptible population, infected population, exposed population, quarantined population and recovered population as we vary the contact rate, β , the rate of quarantine, φ and the proportion of isolated susceptibles because of having had contact with infectives. Simulations were also performed to investigate the behavior of the different classes of the population when the reproductive number, $R_0 < 1$ and when the reproductive number, $R_0 > 1$. The simulations performed strongly suggested that quarantine is the most effect way of controlling the spread of the Ebola virus. The numerical simulations also suggested that the disease can be controlled when the reproductive number, $R_0 < 1$. The numerical simulations were done using Matlab package and the parameters used in the simulations were estimates.