

COVID-19 dynamics in Africa under the influence of asymptomatic cases and re-infection

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Abstract

Since December 2019 that coronavirus pandemic (COVID-19) has hit the world, with over 13 million cases recorded, only a little above 4.67 percent of the cases have been recorded in the continent of Africa. The percentage of cases in Africa rose significantly from 2 percent in the month of May 2020 to above 4.67 percent by the end of July 15, 2020. This rapid increase in the percentage indicates a need to study the transmission, control strategy, and the dynamics of COVID-19 in Africa continent. In this study, a nonlinear mathematical model to investigate the impact of asymptomatic cases on the transmission dynamics of COVID-19 in Africa is proposed. The model is analyzed, the reproduction number is obtained, the local, as well as the global, asymptotic stability of the equilibria were established. We investigate the existence of backward bifurcation and we present the numerical simulations to verify our theoretical results.

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