

Modeling, Analysis and Simulation of COVID-19 interaction dynamics between local community in Saudi Arabia and visiting sub-population

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The spread of the corona virus COVID-19 continues to impact many across the globe ever since it initiated end of 2019. Many researchers have been conducted extensive investigations to help understand the dynamics of COVID-19 and control the spread of this epidemic through mathematical modeling. Since the first case in the Kingdom of Saudi Arabia (KSA), the infected number of cases continued to grow rapidly which made the Saudi government take several measures including putting restrictions on travel to and from Saudi Arabia. In this work, a novel SEIQRH model is developed to accommodate two groups of sub-populations: Local population of KSA and a visiting population of KSA and their interaction. Along with analysis of the proposed model, the basic reproduction number of the model was also derived using next generation matrix, and the sensitivity of reproduction number against parameters measured. Moreover, numerical simulations of the model were performed and the actual data for COVID-19 cases in KSA was used to validate the numerical results.

Keywords: COVID-19, compartment modeling, Reproduction Number.

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