Modeling the Effects of Media Awareness on SARS-CoV-2 Transmission in Georgia

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The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that emerged in December 2019 poses an enormous threat in public heath worldwide. The role of media coverage on disease outbreaks is crucial. Thus, we formulate an SEIR-type model of SARS-CoV-2 with two susceptible classes comprising individuals who are unconscious to SARS-CoV-2 spread and control and those who are conscious to SARS-CoV-2 spread and control due to media coverage. The disease-free equilibrium of our model is derived, and the media-dependent reproduction number ($\mathcal{R}_M$) is computed. We established the existence of a unique endemic equilibrium when $\mathcal{R}_M > 1$, and investigated the local and global stability of the disease-free equilibrium when $\mathcal{R}_M < 1$. The Latin Hypercube Sampling technique is used to identify parameters that are sensitive in reducing the media-dependent reproduction number. Using data on the cumulative number of cases of symptomatic infections from the state of Georgia, we estimated unknown parameters of our model. Numerical simulations of our model suggest that as more unconscious susceptible humans transition to conscious susceptible humans, there is a decrease in prevalence. Furthermore, an increase in the messaging rate of COVID-related information by conscious susceptible humans suggest a decrease in the media-dependent reproduction number and the number of cumulative cases. These results highlight the importance of media on the transmission and control of SARS-CoV-2 in the population.