World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:17, No:04, 2023

Stability and Sensitivity Analysis of Cholera Model with Treatment Class

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Abstract : Cholera is a gastrointestinal disease caused by a bacterium called Vibrio Cholerae which spread as a result of eating food or drinking water contaminated with feaces from an infected person. In this work we proposed and analyzed the impact of isolating infected people and give them therapeutic treatment, the specific objectives of the research was to formulate a mathematical model of cholera transmission incorporating treatment class, to make analysis on stability of equilibrium points of the model, positivity and boundedness was shown to ensure that the model has a biological meaning, the basic reproduction number was derived by next generation matrix approach. The result of stability analysis show that the Disease free equilibrium was both locally and globally asymptotically stable when $R_0 < 1$ while endemic equilibrium has locally asymptotically stable when $R_0 > 1$. Sensitivity analysis was perform to determine the contribution of each parameter to the basic reproduction number. Numerical simulation was carried out to show the impact of the model parameters using MAT Lab Software.

Keywords : mathematical model, treatment, stability, sensitivity
Conference Title : ICSM 2023 : International Conference on Statistics and Mathematics
Conference Location : Marrakesh, Morocco
Conference Dates : April 17-18, 2023