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TRANSMISSION DYNAMICS OF SCHISTOSOMIASIS-MALARIA DUAL INFECTION WITH OPTIMAL CONTROL

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Schistosomiasis is largely a water-snail related disease that mostly affects school aged children in developing countries. Malaria is an ancient disease that is still thriving and threatening to be a major source of death and disability due to climate change and socio-economic conditions.

This paper presents a mathematical model for Schistosomiasis-Malaria dual infection in order to investigate the relationship in their transmission. The steady state of the single infection was analyzed, existence, stability of the equilibria and the basic reproduction numbers were established. The single-infection and the dual infection models exhibited backward bifurcations. Sensitivity analysis was carried on the dual-infection model, and it was discovered that increased in Schistosomiasis infection may not implies increased in Malaria infection while the reverse is the case.

The existence of an optimal control was established, the Hamilton and Pontryagin principles for optimal control was employed to provide insights on control input interventions.

Author: EDOGBANYA, Helen Olaronke (Federal University Lokoja)

Co-authors: BADAKEI, Jacqueline Azumi (Federal University Lokoja); SANI, Umar (Federal University Lokoja)

Presenter: EDOGBANYA, Helen Olaronke (Federal University Lokoja)

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