Modelling the lockdown scenarios on COVID-19 dynamics in Zimbabwe

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In this research, we present a mathematical model to explore the dynamics of COVID-19. Our study seeks to gain insight into the influence of lockdown measures and the roles played by population groups in disease transmission. We distinguish between two populations: one subject to lockdown restrictions and the other remaining active, encompassing health workers and essential service providers. To account for the effect of lockdown, we introduce a reduction coefficient, denoted as ρ, which decreases interpersonal interactions within the population and another parameter, ϵ, signifying the extent of precautions the active population practices. We determine the basic reproduction number and assess the stability of equilibrium points. We perform simulations, varying the values of ρ and ϵ, in order to assess the impact of lockdown stringency on the reproduction number. Our findings reveal that the two-group model offers valuable insights into the effectiveness of intervention measures and the dynamics between active and non-active populations. A noteworthy observation is that lockdown yields better results when both population groups actively engage in disease control efforts.

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