

A Mathematical Analysis of Behavioural Epidemiology: Drugs Users Transmission Dynamics Based on Level Education for Susceptible Population

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Abstract : The spread of drug users is one kind of behavioral epidemiology that becomes a threat to every country in the world. This problem caused various crisis simultaneously, including financial or economic crisis, social, health, until human crisis. Most drug users are teenagers at school age. A new deterministic model would be constructed to determine the dynamics of the spread of drug users by considering level of education in a susceptible population. Based on the analytical model, two equilibria points were obtained; there were E_0 (zero user) and E_1 (endemic equilibrium). Existence of equilibrium and local stability of equilibria depended on the Basic Reproduction Ratio (R_0). This parameter was defined as the expected rate of secondary prevalence and primary prevalence in virgin population along spreading primary prevalence. The zero-victim equilibrium would be locally asymptotically stable if $R_0 < 1$ while if $R_0 > 1$ the endemic equilibrium would be locally asymptotically stable. The result showed that R_0 was proportional to the rate of interaction of each susceptible population based on educational level with the users' population. It is concluded that there was a need to be given a control in interaction, so that drug users population could be minimized. Numerical simulations were also provided to support analytical results.

Keywords : drugs users, level education, mathematical model, stability

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