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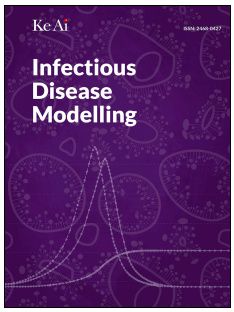

The analysis of a drug transmission model with family education and public health education

Jun Li, Mingju Ma

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The analysis of a drug transmission model with family education and public health education

Jun Li[a], Mingju Ma[b]

[a] *School of Mathematics and Statistics, Xidian University, Xi'an, 710071, P. R. China*

[b] *School of Science, Xi'an Polytechnic University, Xi'an, 710048, P. R. China*

Abstract In this paper, we formulate a six dimensional drug transmission model to study the effect of family education and public health education. The dynamical behaviors of the model are discussed in terms of the basic reproduction number R_0. By constructing Lyapunov functions, we obtain the drug-free equilibrium is globally asymptotically stable if $R_0 \leq 1$ and the drug addiction equilibrium is globally asymptotically stable if $R_0 > 1$. Sensitivity analyses are performed to seek for effective control measures for drug spread. The analysis show that both the family and public health education can influence the spread of drug transmission. However, the combination of family and public health education is more effective to reduce the prevalence of drugs. Some numerical simulations are given to confirm the obtained theoretical results.

Keywords: Drug model; Basic reproduction number; Public health education; Sensitivity; Stablity.

Mathematics Subject Classification: 92D30

1 Introduction

Drug abuse is one of the most serious health and social problems around the world and has attracted governments' attentions. More and more people are infected by various drugs. Curiosity, thrill, seeking negative mentality and environmental impact are the main key factors to tempt susceptible individuals to contact with drugs. The U.S. Centers for Disease Control and Prevention in 2015 reported that from 2002 to 2013, the number of Americans over the age of 12 who snort heroin

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E-mail address: lijun@xidian.edu.cn(J. Li), mingjuma@163.com(M. Ma).

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