Modeling and Simulation of the possible routes of transmission of Acinetobacter spp. in the Intensive Care Units: An Agent-Based Computational Study

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Abstract: (66 Views)

Background & Objective: Healthcare-associated infections (HAIs) are serious adverse events that mostly occur in intensive care units (ICUs). Across different infection types, ventilator-associated events (VAE) are of particular concern. Thus, using an agent-based model, we attempted to identify the potential role of mechanical ventilation in transmission of *Acinetobacter* spp. in ICU settings.

Methods: For the purpose of this computational study, we designed an agent-based model of patients in a regional network of four hospitals in Mashhad, Iran from April 2017 to September 2019 and measured all necessary parameters for the model input. *Net Logo* was utilized for implementing agent-based model, and R for the data analysis and design of experiments.

Results: A total of 4677 HAI events were recorded in ICUs. *Acinetobacter spp.* (21.8%) were the most common pathogens isolated from ICU patients, followed by *Klebsiella spp.* (13.2%) and *Staphylococcus spp.* (12.2%). HAIs in the first place in the form of VAE (37.7%) were caused by *Acinetobacter spp.* in more than half (58.5%).

Conclusion: The simulation methods such as agent-based modeling will be useful for intervention and management planning, futurism and reduce mortality and costs. Using the appropriate tools to control hospital infections according the guidelines and bundle of the World Health Organization will reduce the probability of transmitting Nosocomial infections and *Acinetobacter spp.* in ICU. In this study; patient-related parameters were implied. Intervention studies recommended.

Keywords: Cross Infection, Mechanical Ventilation, Agent-based Model, Acinetobacter, Intensive Care Units

Type of Study: Original Research Article | Subject: Nosocomial infections

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