

Evaluation of hospital disaster preparedness by a multi-criteria decision making approach: The case of Turkish hospitals

Miguel Ortiz-Barrios, Muhammet Gul, Pedro López-Meza, Melih Yucesan , Eduardo Navarro-Jiménez

Abstract

Considering the unexpected emergence of natural and man-made disasters over the world and Turkey, the importance of preparedness of hospitals, which are the first reference points for people to get healthcare services, becomes clear. Determining the level of disaster preparedness of hospitals is an important and necessary issue. This is because identifying hospitals with low level of preparedness is crucial for disaster preparedness planning. In this study, a hybrid fuzzy decision making model was proposed to evaluate the disaster preparedness of hospitals. This model was developed using fuzzy analytic hierarchy process (FAHP)-fuzzy decision making trial and evaluation laboratory (FDEMATEL)-technique for order preference by similarity to ideal solutions (TOPSIS) techniques and aimed to determine a ranking for hospital disaster preparedness. FAHP is used to determine weights of six main criteria (including hospital buildings, equipment, communication, transportation, personnel, flexibility) and a total of thirty-six sub-criteria regarding disaster preparedness. At the same time, FDEMATEL is applied to uncover the interdependence between criteria and sub-criteria. Finally, TOPSIS is used to obtain ranking of hospitals. To provide inputs for TOPSIS implementation, some key performance indicators are established and related data is gathered by the aid of experts from the assessed hospitals. A case study considering 4 hospitals from the Turkish healthcare sector was used to demonstrate the proposed approach. The results evidenced that Personnel is the most important factor (global weight = 0.280) when evaluating the hospital preparedness while Flexibility has the greatest prominence ($c + r = 23.09$)

Keywords

Disaster preparedness; Fuzzy decision making; FAHP; FDEMATEL; TOPSIS; Turkish hospitals