A new emergency risk evaluation approach during the COVID-19 pandemic

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Abstract

When major emergencies or accidents occur, risk evaluation and prediction are the most important means to reduce the impact of these disasters. Typical risk evaluation uses the failure mode and effects analysis (FMEA) method for failure risk ranking and control. However, when faced with severe special infectious diseases such as COVID-19, there will be many cognitive and information uncertainties that the FMEA method is unable to effectively handle. To effectively deal with the issue of risk evaluation during the COVID-19 pandemic, this paper integrated the risk priority number and spherical fuzzy sets methods to propose a novel emergency risk evaluation method. In the numerical verification, this paper applied the example of avoiding secondary COVID-19 transmissions in the hospital to explain the calculation procedure and validity of the proposed new emergency risk evaluation approach. The calculation results were also compared with the typical RPN, fuzzy set, and intuitionistic fuzzy set methods. The calculation results showed that the proposed new emergency risk evaluation approach could effectively handle the cognitive and information uncertainties of emergency risk evaluation issues during the COVID-19 pandemic.

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