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Major Article

Middle East respiratory syndrome risk perception among students at a university in South Korea, 2015

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Background: The 2015 Middle East respiratory syndrome (MERS) outbreak in South Korea was a serious threat to public health, and was exacerbated by the inappropriate responses of major institutions and the public. This study examined the sources of confusion during the MERS outbreak and identified the factors that can affect people's behavior.

Methods: An online survey of the risk perception of university students in South Korea was performed after the epidemic had peaked. The questionnaire addressed the major social determinants in South Korea during the MERS epidemic. The analysis included data from 1,470 subjects who provided complete answers.

Results: The students had 53.5% of the essential knowledge about MERS. Women showed higher risk perception than men, and trust in the media was positively associated with risk perception ($P < .001$). Additionally, risk perception was positively associated with overreaction by the public (odds ratio, 2.80; 95% confidence interval, 2.17–3.60; $P < .001$). These findings suggest that media content affected the public's perception of MERS risk and that perception of a high level of risk led to overreaction.

Conclusions: Risk perception was associated with most of the social factors examined and overreaction by the public. Therefore, providing accurate information and data to the public, establishing trust, and facilitating the development of an attitude will all be important in future crises.

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The first Middle East respiratory syndrome (MERS) case was confirmed in South Korea on May 20, 2015. The last case was diagnosed on July 4 and summed up to a total of 186 confirmed cases, almost half of which were in Seoul. After that, South Korea officially declared the end of the MERS epidemic on December 23, 2015. During the MERS outbreak, 38 died and 16,752 had been quarantined (Fig 1).¹ The case fatality rate of MERS in South Korea was approximately 20.4%, lower than that on the Arabian Peninsula (approximately 45%).²

Public apprehension was exacerbated because the government did not disclose timely information about the status of the epidemic or hospitals' names and procedures related to MERS infection. Therefore, the public were unaware of the appropriate actions to take, but were provided with relevant information by the media.

Indeed, several citizens created Web sites that listed confirmed and suspected MERS patients.³ However, the public also received inaccurate information from the Internet and social media; this increased the level of concern over MERS and resulted in rumors. The government of South Korea stated that any person who disseminated an untrue rumor would be prosecuted, but this failed to reduce the level of panic.

Although this action was supposed to prevent secondary damage, it was similar to the censorship of the media in China, where the propaganda departments of the Chinese Communist Party directly supervised the media flow when the severe acute respiratory syndrome (SARS) outbreak occurred in 2003.⁴ The Chinese government attempted to maintain political, social, and economic stability by minimizing the SARS crisis through the withholding of information; however, a reverse effect occurred. Nevertheless, the Chinese government assigned responsibility for censorship of the media, including the Internet, to local agencies.⁵ In the new media age, in which social media (including the Internet, short message services, and mobile applications) are centralized, the government restricts freedom of expression in the same way as it has restricted such freedom among traditional media sources, such

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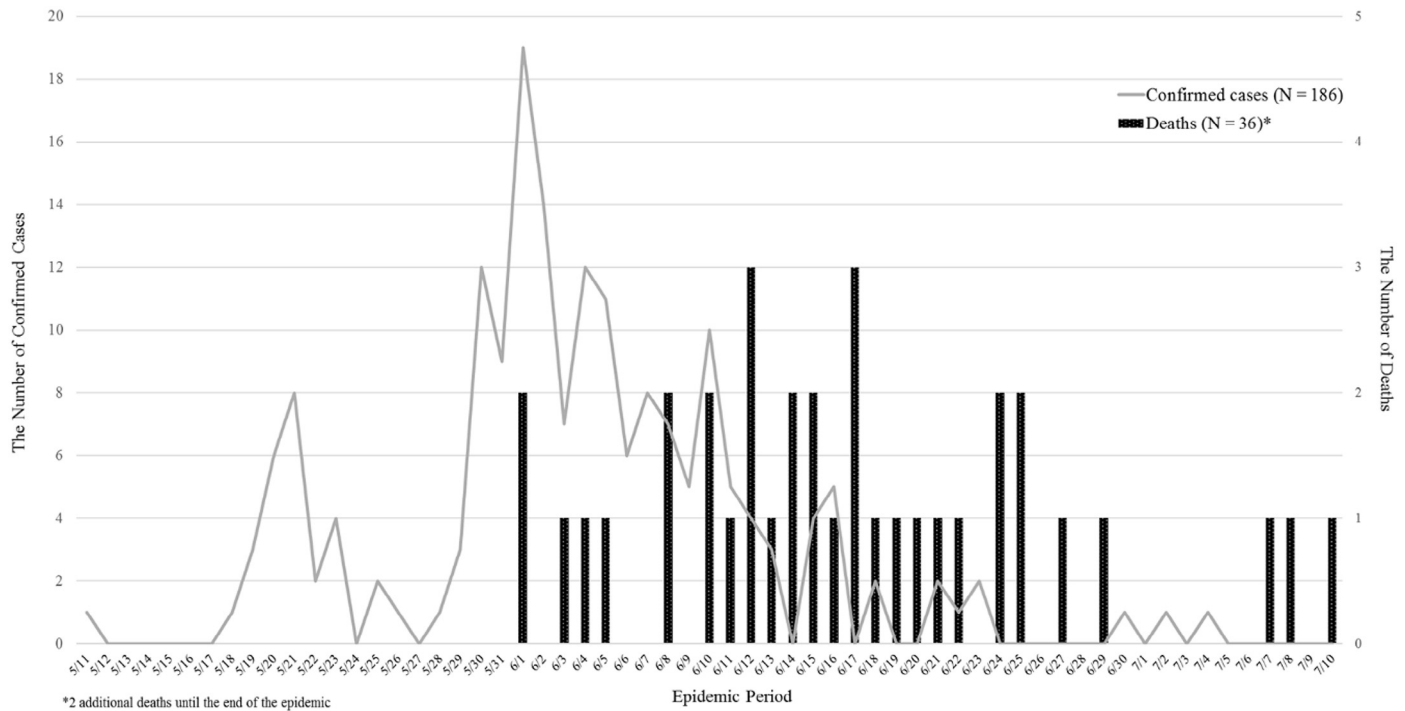


Fig 1. Epidemic curve of Middle East respiratory syndrome in South Korea from May 11–July 10, 2015.

as newspapers, radio, and television.⁶ The control of the acquisition of information is more difficult in this new age because social media are tools not only for the dissemination, sharing, and seeking of health information but also for the expression of feelings and the sharing of personal experiences and opinions.^{7,8} Therefore, organizations need to build effective communication tools to respond to emerging infectious disease (EID) outbreaks because the public may express scientific skepticism about scientific topics and participation in decision-making.⁹

During epidemics, people usually require guidance on how to behave from a trusted source. The government and public institutions are the ideal sources because people tend to rely on the national administration. For this reason, trust in these institutions plays a main role in the public's acceptance of policies and actions.¹⁰ The World Health Organization suggested that outbreak communication should incorporate the following 5 key factors: (1) building, maintaining, or restoring trust; (2) announcing early; (3) maintaining transparency; (4) understanding the public; and (5) planning of all aspects of the response to an outbreak.¹¹ Therefore, risk communication enhances the decision-making ability of laypeople, and can be examined by assessing risk perception.¹² Trust in not only the government and public agencies but also in the media and other institutions may be associated with risk perception. Therefore, the instigation of fear among the public by the media may contribute to social panic, particularly in emergency situations.

The term risk perception usually refers to individuals' judgments about and evaluations of hazards to which they might be exposed.¹³ Therefore, risk perception might be among the social phenomena related to exposure to the risk of disease. In addition, perceived risk influences health behavior both positively and negatively.¹⁴ During the MERS outbreak in South Korea, negative behaviors were observed, such as oversensitive or inappropriate reactions. Some children of health care workers at hospitals treating MERS patients were prevented from attending school. Meanwhile, self-quarantined subjects occasionally escaped out of their homes until the level of infection subsided. These reactions of citizens reflect

distrust in the government and accelerated noncompliance with the directions provided by the Korea Centers for Disease Control and Prevention. This finding is important because overreaction is an indicator of the level of trust in the government among the public and may provoke another social problem related to moral panic.¹⁵

Fear causing the behaviors described previously mentioned is likely related to risk perception and a low level of trust in the government and society. However, because risk perception may be related to a number of unknown determinants, it is important to identify factors that may affect risk perception. Sjöberg examined risk perception using several approaches,¹⁶ and reported that 30%–40% of risk perception could be explained by risk sensitivity, attitude, and a specific fear model. In other models, <20% of risk perception was explained. There were also some studies regarding risk perception. Previous studies of risk perception related to nuclear explosions and infectious diseases addressed the relationship between perceived risk and various social predictors, such as knowledge, social trust, and attitude.^{17,18} However, previous literature on the determinants of risk perception has been limited.

The aim of this study was to determine whether risk perception was associated with personal and social variables, including trust in the media, the health care field, and government. Additionally, we sought to identify the associations of risk perception and social variables with compliance with self-quarantine guidelines and overreaction during the MERS epidemic. In this study, knowledge, trust, personal characteristics, and other social determinants were considered the main factors affecting risk perception and overreaction.

METHODS

Questionnaire

We developed a questionnaire based on previous studies of perception of the risk of SARS and Ebola conducted outside of South Korea.^{19–21} The questionnaire comprised the following 5

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