# Preparedness of young male physicians for biological terrorism and warfare in South Korea

韓國的年輕男醫生對生物恐怖主義活動和戰爭的防備

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*Introduction:* The events of 11th September 2001, and the subsequent anthrax attacks in the United States brought the threat of bioterrorism to the forefront of concern for public health departments. Moreover, the rising confrontation between North and South Korea emphasizes the possibility of aggression with biological weapons and our vulnerability to bioterrorism. While the importance of physicians' interests and management ability is becoming more critical, no studies have yet been undertaken in Korea to assess whether primary care physicians are well informed and capable of managing bioterrorism. This study evaluates the awareness and response of young male physicians to potential bioterrorism in South Korea. *Method:* A total of 692 young male physicians completed the knowledge and awareness survey during the education period of military service on 9th April 2005. *Results:* Forty-five percent of the participants responded that the possibility of biological warfare in Korea was high. The level of bioterrorism knowledge, however, was low. Eighty-seven percent acknowledged the necessity of education and training for bioterrorism, and 69.9% were willing to accept education and training in bioterrorism preparedness. *Conclusion:* These findings suggest that young physicians should receive continuous education and training to improve preparedness for biological terrorism and warfare in South Korea. (Hong Kong j.emerg.med. 2012;19:18-22)

**引言**:2001年9月11日的事件,以及隨後在美國的炭疽襲擊所帶來的生物恐怖主義的威脅,都大大提高了公共衛生部門的關注。此外,南北韓之間的對抗上升,也增加了侵略與生物武器使用的可能性和南韓面對生物恐怖主義的脆弱性。雖然醫生對生物恐怖主義的與趣和處理能力的重要性變得越來越重要, 在韓國尚沒有研究評估基層醫生是否有充足的知識和處理生物恐怖主義活動的能力。本研究評估韓國的 年輕男醫生對潛在的生物恐怖主義活動的意識和應對。方法:2005年4月9日,在服兵役的教育期,共 有692年輕的男醫生完成了一個知識和意識的調查。結果:45%的參與者回應時表示,在韓國發生生物 戰的可能性很高。然而,生物恐怖主義的知識水平低。87%認同生物恐怖主義的教育和培訓的必要性。 69.9%的人願意接受生物恐怖主義的防備教育和培訓。結論:這些結果表明,年輕的醫生應接受繼續教 育和培訓,以提高對在韓國發生的生物恐怖主義活動和戰爭的防備。

Keywords: Biological warfare, bioterrorism

**阔鍵詞:**生物戰、生物恐怖主義

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## Introduction

The events of 11th September 2001, and the subsequent anthrax attacks made the threat of domestic bioterrorism a major concern of United State (U.S.) public health departments. As with any infectious disease outbreak or other public health emergency, early detection and reporting by physicians is the key to facilitating timely and effective responses to biological attacks.<sup>1</sup>

The diplomatic impasse between North and South Korea highlights the potential for biological warfare and the vulnerability of the populace to bioterrorism in Korea. The possibility of biological attack is escalated in Korea, because South Korea has dispatched military personnel abroad, and U.S. troops are stationed in South Korea. Despite the importance of physicians' interests and management abilities, no studies have investigated the preparedness for bioterrorism and biological warfare in young male physicians serving in the military in South Korea. Therefore, we assessed the level of knowledge and awareness of young male physicians as to how they would respond to bioterrorism and biological warfare in Korea.

# Material and method

We used the modified survey instrument developed by the Korean Medical Association and the Korean Centers for Disease Control and Prevention. The questionnaire was designed to determine bioterrorism preparedness, knowledge of bioterrorism-related agents, and opinions of probable actions in an emergency. Demographic survey questions included age and specialty. A cross-sectional survey was conducted using the structured questionnaire, which was distributed to 692 young male physicians during the education period for military service on 9th April 2005. The questionnaire used five-category Likert scales, ranging from "very low" to "very high" to measure physicians' opinions regarding the possible occurrence of biological attacks. Participants were also asked to list two biologic agents that might be used in bioterrorism and biological warfare in Korea. The

finalised database was analysed using the Statistical Package for Social Sciences 11.5 (SPSS, Inc., Chicago, IL, U.S.) to determine the distribution of responses.

## Results

A total of 692 young male doctors responded to the questionnaire. The average age of respondents was 30 years (range: 26-35 years), with 40% being general physicians (Table 1); 75% of the participants had never heard about physicians' preparedness for bioterrorism in the U.S. or Europe. Virtually none of the physicians in clinical practice had even considered the possibility of a biological attack. However, more than 80% of the participants felt that education and training for bioterrorism was necessary, and about 70% were willing to receive the necessary education and training (Table 2).

The number of respondents who believed that a biological attack in Korea had a high possibility was more than twice the number of those who thought it to have a low possibility (very high, 10.0%; high, 35.1%; moderate, 36.8%; low, 14.6%; very low, 3.5%). Although many physicians responded that anthrax and plague were most likely to be used as bioterrorism-

Table 1. Demographic characteristics of the survey participants

| Age in years (range) | 30.19±2.03 (26-35) |  |
|----------------------|--------------------|--|
| Specialty(%)         |                    |  |
| General physician    | 282 (40.8)         |  |
| Internal medicine    | 77 (11.1)          |  |
| Orthopaedics         | 68 (9.8)           |  |
| Surgery              | 60 (8.7)           |  |
| Neurosurgery         | 33 (4.8)           |  |
| Otolaryngology       | 27 (3.9)           |  |
| Urology              | 22 (3.2)           |  |
| Other*               | 123 (17.7)         |  |

\*Other included anesthesiology, paediatrics, psychiatry, dermatology, thoracic surgery, ophthalmology, diagnostic radiology, neurology, plastic surgery, obstetrics and gynaecology, pathology, nuclear medicine, clinical pathology, rehabilitation medicine, therapeutic radiology, family medicine, occupational and environmental medicine, emergency medicine, preventive medicine. related agents in Korea, only 8% thought that smallpox would be included in this list (Table 3). More than half of the physicians were unaware of vaccination programs against the threat of biological attack. The majority of them did not know that the Korean government had a national pharmaceutical stockpile to provide medical supplies in the event of a biological attack (Table 3).

# Discussion

Since bioterrorism became a reality after its occurrence in the U.S., the Korean government has been preparing and conducting strategic plans for a response to domestic bioterrorism. Korea has dual surveillance systems for early detection of bioterrorism. The first is a "syndromic" surveillance system that typically monitors nonspecific clinical information that indicates possible bioterrorism-associated diseases before specific diagnoses are made. The second is an infectious disease specialist network that diagnoses and responds to biological attacks. Infectious disease physicians, clinical microbiologists, and infection-control professionals play crucial roles in this network. Infectious disease specialists will develop practical and realistic emergency management plans in partnership with local health departments to get ready for real or suspected bioterrorism attacks.<sup>2</sup> With regard to preparatory efforts for bioterrorism, the Korean government is

Table 2. Physicians' responses to selected survey items that indicate awareness and preparedness for a biological attack

| Survey items   | Yes (%)    | No (%)     |
|--|------------|------------|
| Have you ever heard that doctors are trying to prepare and respond to biological attack in U.S. or Europe?     | 429 (62.0) | 263 (38.0) |
| Have you ever suspected of the possibility of biological attack when you diagnosed unknown infectious disease? | 11 (1.6)   | 681 (98.4) |
| Are you willing to vaccinate yourself to prevent possible bioterrorism-related agents?                         | 559 (80.8) | 131 (18.9) |
| Do you think education and training are necessary for physicians to prepare and respond to biological attack?  | 608 (87.9) | 84 (12.1)  |
| Are you willing to join in education and training program for bioterrorism and biological warfare?             | 484 (69.9) | 206 (29.8) |

#### Table 3. Knowledge about bioterrorism

|                        | The most probable<br>bioterrorism-related agents<br>in Korea (multiple of marking<br>is allowed up to two) | Awareness of the type of<br>inoculated vaccination for<br>bioterrorism in U.S.<br>troops in Korea | Awareness of national<br>pharmaceutical stockpile<br>the Korean government for<br>preparing bioterrorism |
|------------------------|--|---|--|
| Anthrax                | 635 (46.0)   | 267 (38.6)  | 17 (2.5)   |
| Smallpox               | 110 (8.0)  | 13 (1.9)  | 9 (1.3)  |
| Plague                 | 280 (20.3)   | 3 (0.4)   | 1 (0.1)  |
| Botulism               | 98 (7.1)   | _   | _  |
| Cholera                | 87 (6.3)   | _   | 1 (0.1)  |
| Typhoid fever          | 21 (1.5)   | _   | 4 (0.6)  |
| Avian influenza        | 55 (4.0)   | _   | _  |
| Viral haemorrhagic fev | er –   | 1 (0.1)   | 5 (0.7)  |
| Other*                 | 95 (6.8)   | _   | _  |
| Not sure               | _  | 403 (58.2)  | 654 (94.5)   |

Data were presented as number (%).

\*Other includes malaria (2.5%), vancomycin-resistant bacteria (1.8%), human immunodeficiency virus (0.8%), diphtheria (0.5%), meningococcus (0.5%), tuberculosis (0.3%), hepatitis A virus (0.2%), hepatitis B virus (0.2%).

reinforcing the organisation, law, epidemiologic capacity, research, and management of critical infectious agents and preparing a national pharmaceutical stockpile including smallpox vaccine and antibiotics.<sup>3,4</sup> North Korea had been cited on the U.S. State Department's list of countries that sponsor terrorism. Although the U.S., along with China, Russia, Japan, and South Korea – countries with particular security concerns-established diplomatic negotiations with North Korea in what was known as the Six-Party Talks in 2003, North Korea became a nuclear-weapon state, conducting its first nuclear test and raising global security concerns in 2006.

Illnesses due to bioterrorism may not be naturally occurring diseases, and thus signs and symptoms may not be familiar to many physicians. In the U.S., more than 2 weeks passed from the time of symptom onset of the index case to the first recognition that an anthrax outbreak had occurred due to bioterrorism. This case showed the difficulty in recognising bioterrorism in clinical practice. The last case of smallpox was reported in 1960, and physicians aged less than 60 years have no experience with smallpox. Anthrax is a rare zoonosis, and no case has been reported in Korea regarding inhalation anthrax.<sup>5</sup>

Although bioterrorism is unpredictable, physicians should remain alert to the possibility of biological attack at all times to prevent the social confusion of bioterrorism. Physicians' involvement may be the key to early detection, emergency response, initial patient care, coping with tragedy and stress-related disorders that might occur at that time.<sup>6-11</sup> Education on bioterrorism in South Korea is in its infancy and the level of knowledge about biological attack is very low. In a previous national survey in the U.S., 75% of physicians felt they were not prepared for bioterrorism, and less than 30% of the family physicians thought that the U.S. health care system would respond effectively to bioterrorism.<sup>12</sup> Another study showed that while 80% of physician respondents were willing to consult in a biological attack, only 21% felt confident in handling the cases.<sup>13</sup>

## Limitation

In such cases involving e-mail surveys, a possibility of selection bias exists because respondents are usually interested in the topics of the survey. In this study, however, all of the participants responded to the questionnaire. Moreover, all of them were young male physicians who would be responsible for medical care under conditions of biological warfare. Under South Korea's military service system, all young men must serve for more than 2 years. Young Korean male physicians complete their military service as a medical officer or public health doctor. Therefore, men aged above 40 years and women were not included in this study.

## Conclusion

This is the first study on the preparedness for bioterrorism and biological warfare in young male physicians serving in the military in South Korea. This study provides a baseline assessment of physicians' current level of preparedness for biological attack in South Korea. The risk of biological attack in Korea is higher than in any other country, but young male physicians as frontline soldiers, are not fully prepared for a biological attack. These findings suggest a need for young physicians to participate in continuous education and training programs to improve preparedness for biological terrorism and warfare in South Korea.

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