

Analysis of the Medical Health Disaster Management System

- MERS Disaster Response -

Long Tian An^{1#}, Jae Eun Lee¹⁺, Joong Kook Choi²

¹ National Crisis & Emergency Management Research Institute, Chungbuk National University, 1 Chungdae-ro, Seowon-gu, Cheongju, Korea

² Department of Biochemistry, College of Medicine, Chungbuk National University, 1 Chungdae-ro, Seowon-gu, Cheongju, Korea

Abstract

In 2015, MERS disaster broke in South Korea and China, which posed a threat to the public safety of the two countries. In 2003, Korean government has taken effective measures to deal with SARS disaster, but the response taken by Korean government for MERS disaster in 2015 were not appropriate to cause large losses and public concern, whereas Chinese government has taken effective measures to minimize the loss of MERS to the public. This study analyzes the disaster management and medical health disaster management system in China, then analyzes the disaster response process to MERS through five aspects in Guangdong Province, China. And we compare the disaster response measures between China and South Korea. In conclusion, we suggest that disaster response should involve joint participation of central government, local government, and citizens since these three parties are indispensable for timely and proper disaster management.

Key words: MERS, disaster management, medical health disaster management system, disaster response

1. Introduction

In 2012, a new virus, Middle East Respiratory Syndrome(MERS), was discovered in the Middle East region and the MERS began to spread. An 68-year-old man was reported to have returned to South Korea from Bahrain with MERS virus on May 20, 2015. Then MERS virus spread rapidly in South Korea and 164 people were isolated in a week,

On September 2, 2015, according to a report from the Central MERS Control and Prevention, Korea Centers for Disease Control and Prevention, Ministry of Health and Welfare, 186 patients were infected with MERS. Among the patients, 36 of them died and 142 patients were discharged. The mortality rate for MERS is 19.4% and the survival rate is 76.3%. On December 23, the Ministry of Health and Welfare officially declared that the

[#] The 1st author: Long Tian An, Tel. +82-43-261-3337, e-mail. anlnt@cbnu.ac.kr

⁺ Corresponding author: Jae Eun Lee, Tel. +82-43-261-2197, e-mail. jeunlee@cbnu.ac.kr

MERS was over in South Korea. However, the declaration was made 7 months after May 20 when the first patient was discovered. In 2003, when the Severe Acute Respiratory Syndrome(SARS) caused massive damage on the world, the Korean government implemented thorough response to SARS, so that there was no confirmed case and only three suspected cases. Such thorough response made World Health Organization(WHO) to praise South Korea as the exemplary nation. The situation, however, changed significantly in only 10 years.

On the other hand, China suffered huge loss of life and national economy due to SARS in 2003. According to report released by WHO in August 15, 2003, 7747 patients were diagnosed of SARS and 829 died in China (including Hong Kong and Taiwan). However, there were no confirmed cases except for the first confirmed case with Korean citizenship during the period of MERS in 2015(Xinhuanet, 2015). In order to deal with the accident such as SARS and MERS, both the Korean and Chinese governments established a crisis and emergency management system. In the period of MERS, the Chinese government implemented effective and quick ways to minimize the damage from MERS. In contrary, the Korean government has not taken a similar action resulting in worsening of MERS and huge damage in Korea. Consequently, Korean citizens and media criticized the Korean government for mishandling this public issue.

This study examined the disaster management system and the medical health disaster management system in China. Then, this study arranged the methods and procedures of disaster management

in Guangdong Province which had the highest risk of infection in 2015 MERS. This study also analyzed the methods and procedures of medical health disaster management system in Korea and China.

II. Medical Health Disaster Management System in China

1. Significance of Disaster Management in China

Prior to SARS in 2003, in China mainly focused on disaster recovery than prevention and there were only several systematic disaster response manuals in some cities such as Shanghai. After SARS in 2003, the Chinese government has recognized the necessity and importance of disaster management and enacted policies for disaster management(Communist Party of China, 2003). From such measures, Chinese disaster management has made a significant progress.

Chinese disaster management system includes four parts of prevention plan, organizational system, function, and legal systems. Disaster management prevention plan is aimed at minimizing the damages. Prevention plan requires the department of disaster management to identify the type of potential danger, possibility, procedure, and influence. The prevention plan also regulates departments, human resources, technology, equipment, facility, relief material with detailed manual. With prevention plan, Chinese government regulates affairs and the person who should be responsible for the measures of the three stages—before the disaster, during the disaster, after the disaster(Liu, 2004). In short, disaster management prevention plan is the regulations of disaster management department's resource allocation method to take effective measures promptly and

systematically in the event of a disaster. Disaster management prevention plan in China is composed of 6 levels based on the liable subject: national preventive plan, preventive plan of specialized field, central department preventive plan, prevention plan of local government, preventive measures of enterprises and institutions, and preventive measures of event.

The disaster management organizational system refers to the organizational structure of departments related to disaster management. The organizational system regulates mutual legal position, power distribution, and organizational structure among central disaster management, disaster management departments for specialized field, and disaster management departments in local government. Disaster management organizational system is composed by mutual interaction of horizontal and vertical powers, comprehensiveness and expertise, government and social organizations. In the past, because of the region of authority was unclear, disaster management organizational system lacked comprehensive control towers for a long time. Due to such lack of control towers, issues such as overlap of power, reduction of efficiency, and lack of information frequently occurred in China. Also, there were some cases where golden time was missed due to overlap of resources such as relief equipment and human resources. After the SARS in 2003, the Chinese government regulated the establishment of crisis and emergency management system focusing on specialized field, department, and local government (The State Council of the People's Republic of China, 2006). According to the Chinese government's <Institutional Reform of the State Council>, the Ministry of Emergency Management

was established for the first time on March 13, 2018. This new department has integrated the position of State Administration of Work Safety, crisis management position in General Office of the State Council, fire safety position in Ministry of Public Security, natural disaster relief position in Ministry of Civil Affairs, geologic disaster position in Ministry of Land and Resources. Ministry of Emergency Management in China has four major duties. First, the Ministry of Emergency Management regulates national crisis prevention manual and instructs preparation of disaster response methods in local places. It also promotes establishment of disaster prevention system and disaster prevention drill. Second, the Ministry of Emergency Management establishes the disaster-related information report system and disaster relief system. It promotes distribution of effective resources and human resources, and it also manages major disaster incidents on the national level. Third, the Ministry of Emergency Management in China instructs prevention and measures for fire, drought, geologic disaster. Fourth, the Ministry of Emergency Management supervises safe production in the fields such as manufacturing industry, commerce, and trade.

The function of disaster management is an effective manual prepared based on law, regulation, and guidelines. The disaster management function refers to various functions that are implemented in four stages of prevention and preparation, monitoring and early warning, action and relief, recovery and reconstruction.

The legal system refers to various laws, policies, and guidelines related to disaster management. The legal system is the basis of national actions in the state of emergency and the grounds for national

disaster management. The legal system is also the essential part of national legislation system.

The four parts are the core elements of Chinese disaster management system and those four elements are essential in informing disaster management system. The four elements carry out mutual interaction and supplementation to establish complicated community system(Zhong, 2009).

2. Medical Health Emergency Situation

The concept of emergencies in the world can be divided into four levels: disasters, emergencies, complex emergencies and crises. Chinese government announced <Emergency Regulations for Public Health Emergencies> on May 9, 2003. According to the <Emergency Regulations for Public Health Emergencies>, medical health emergency situation refers to crisis such as serious infectious disease, collective unidentified disease, and food poisoning. Such crisis occurs unexpectedly and it may have significant influence on citizen's health. Crisis is divided into four grades based on dangerousness and influence of crisis(I, II, III, IV). The causes of the crisis are classified as serious infectious diseases, collective unidentified diseases, food poisoning, serious environmental pollution accidents, and casualties caused by natural disasters(The State Council, 2003). Among the causes, serious infectious disease is at the top of medical health emergency situation.

3. Medical Health Disaster Management System

1) Meaning of Medical Health Disaster

Management system

Medical health disaster management refers to a

process of reducing threats to society, politics, economy, health and safety of citizens by taking emergency measures such as observation before or after disaster and early warning, controlling potential cause of accident, and implementing emergency medical health treatments(Wang, 2008). The subject of medical health disaster management is potential disaster and occurring disaster. Medical health disaster management shall focus on observation, early warning, and prevention for potential disaster and after disaster it should focus on post treatment and restoration. There are two goals for medical health disaster, one is to implement effective prevention measure, prevent medical health disaster, and reduce threat to citizen health and social safety. The other goal is to rescue business and citizens under medical health disaster to safe situation through various measures.

2) Prevention Measures of Medical Health Disaster Management

The Chinese government announced the <Emergency Regulations for Public Health Emergencies> (hereinafter referred to as the <Regulations>) in response to the medical health disasters. The <Regulations> has four goals. First, the regulations shall prevent or remove medical health disaster and damage in effective. Second, the regulations shall instruct effective and standardized disaster response measures. Third, the regulations shall minimize the influence of disaster on citizen health. Fourth, the regulations shall secure health and life safety of citizens. The <Regulations> are composed of 8 parts: General provisions, organizational system and position, early warning and report after detection, response

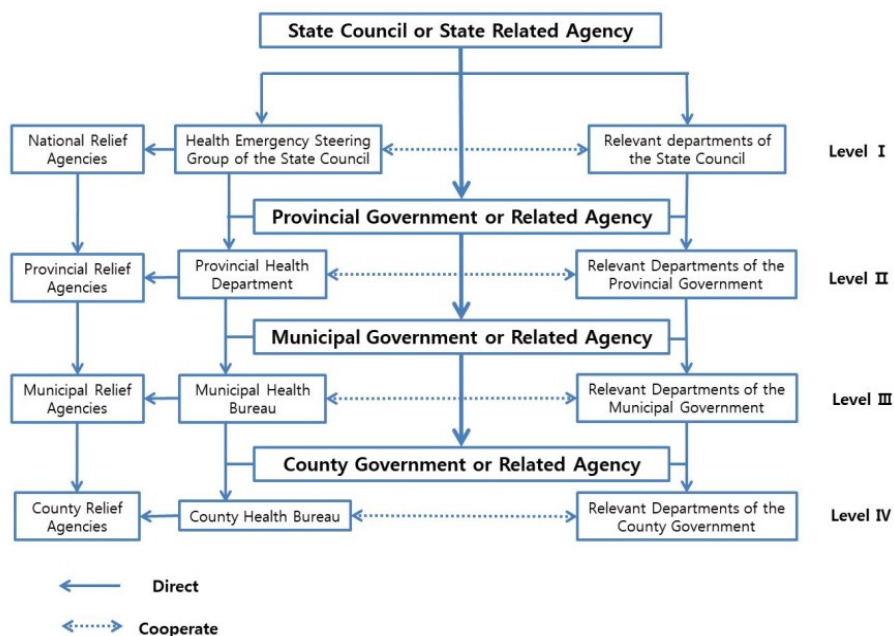
and prevention of disaster, post treatment, guarantee for measure, management and update of prevention plan, and supplementary provisions.

3) Organizational System of Medical Health Disaster Management

The Chinese medical health disaster management system consists of three parts: Daily business management department, emergency crisis center, and advisory committee composed of experts. Chinese emergency crisis center consists of four aspects based on the risk level of medical health disaster (Figure 1). After the outbreak of medical health disaster, the State Council forms crisis management center composed of related departments and military officials. A person in charge of the relevant field takes charge of national response measures as the general director. The state council's medical health department and other departments are responsible for the emergency crisis management tasks within their positions.

After the occurrence of medical health disaster, the crisis and emergency center of provincial and municipal government departments were established and in charge of the field manages responsive measures in the region as the general director. The medical health department in county-level government is responsible for investigation on disaster in detail, control, and medical treatment affairs. Other local government departments support crisis management within their position.

Chinese medical health system is classified into hospital, basic medical hygienic institute, and public hygienic institute (Korea Health Industry Development Institute, 2015: 1-2). First of all, hospital refers to general hospital, Chinese medicine hospital, Chinese and western medical hospital, ethnic hospital and various general hospitals and postnatal care center. Secondly, basic medical hygienic institute refers to community hygienic institute, clinical hygienic institute,



※ Source: Emergency Regulations for Public Health Emergencies.

Figure 1. Organizational System for Public Health Emergencies

Hyangjin hygienic institute, rural hygienic institute, medical examination department, clinic, and medical office. Lastly, public hygienic institute refers to disease prevention center, disease prevention institute for all departments, health organization, health education institute, emergency institute, blood sampling and donation institute, hygiene control institute, and growth and development institute under hygienic department. Infectious hospital, tuberculosis hospital, blood-related disease hospital, mental hospital, and hygiene control(examination) institute are excluded from public hygienic institute.

In china, medical institute refers to institute issued of 'license on medical appliances' from hygienic administration department or institute issued of corporate registration from management department of civil affairs/public affairs organizations. Medical institute also includes institute which provides services such as medical health, disease control, and hygiene control for community of institute for medical science research and medical education,

Medical hygienic institute is classified into clinic, basic medical hygienic institute, and other medical hygienic institutes. While Chinese medical hygienic institute is classified into clinic, basic medical hygienic institute, public hygienic institute, other medical hygienic institutes, other medical hygienic institute irrelevant to medical service is not included in Chinese medical hygienic service system(⟨Figure 2⟩).

4) Function of Medical Health Disaster Management

China has issued the ⟨Emergency Regulations for Public Health Emergencies⟩ (here in after referred to as the ⟨Regulations⟩) and uses the ⟨Regulations⟩ as the response manual in an emergency. The ⟨Regulations⟩ is composed of 6 parts: general provision, prevention and preparation, report and information sharing, crisis measure, liability, and supplementary provision. The ⟨Regulations⟩ will be explained in detail with cases.

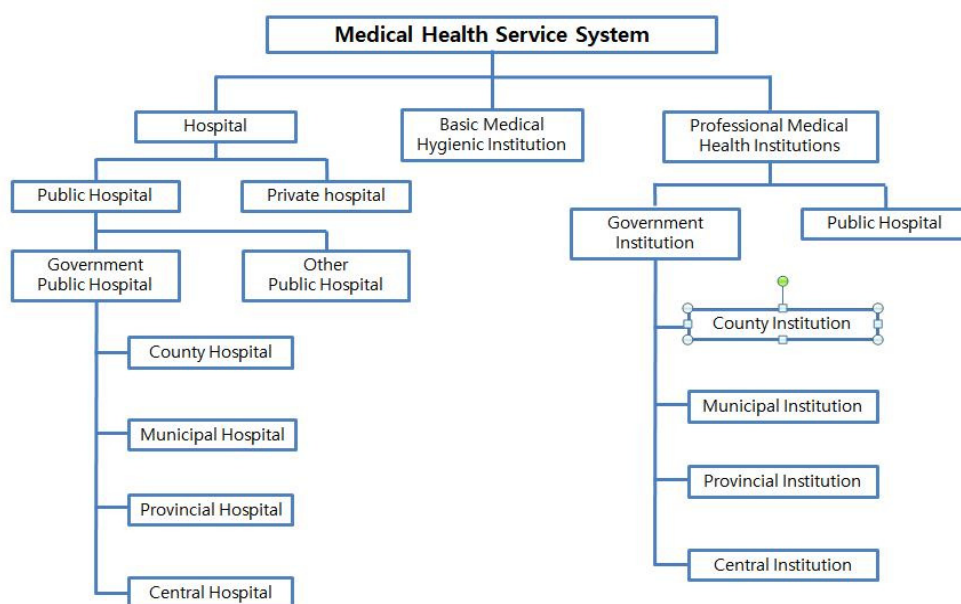


Figure 2. Medical Health Service System in China

5) Legal System of Medical Health Disaster Management

Legal system of medical health disaster management is composed of legislation in four levels based on organizational system. In the national level, 〈National Emergency Plan for Public Health Emergencies〉 and 〈Emergency Regulations for Public Health Emergencies〉 were announced. In the local government level, prevention plan and emergency regulations are implemented in all province, city, and county based on actual situation. All legislations are regulated based on laws such as 〈Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases〉, 〈Food Safety Law of People's Republic of China〉, 〈Law on Prevention and Control of Occupational Diseases in People's Republic of China〉, and 〈Domestic Traffic Health and Quarantine Regulations〉.

4. Precedent Study

The Chinese academic research on MERS is largely divided into two parts, medical field and disaster management field. However, there aren't many researches in disaster management field. Fei, *et. al.*(2015: 44-47) analyzed the four problems in the Chinese government's overseas crisis communication response system based on the MERS occurrence time: Lack of awareness, information acquisition method, information processing system, and early warning system. Then Qiu, *et. al.*(2017: 342-344) analyzed the measures taken by the Chinese government in the event of MERS on the basis of the WHO risk communication principles. Zhou & Chen(2015(S1):49-53) analyzed the MERS accident in Korea by mechanism analysis in occurrence, expansion, evolvement and finality,

that provides references for preventing new infectious diseases and formulating public health safety standards. Furthermore, Song, *et. al.*(2015: 303-306) focused on the government's crisis response process at the time of the MERS crisis by reviewing the reference by conducting field survey. Choi & Cho(2017: 1-21) examined Korean government's MERS response and analyzed the failure to establish cooperative system due to lack of information sharing at the time of MERS crisis. They pointed out that the government's release of information plays significant role in reducing the anxiety and fear in a disaster situation. However, in the MERS crisis, the government did not reveal the hospitals that MERS patients visited due to complacency and excessive consideration for private medical institutes. As a result, public's right to know was violated while rumors and unconfirmed information were all over the Internet. Such rumors and unconfirmed information played a part in higher anxiety and spread of MERS. Lee(2015: 37-54) examined the common issues of the Sewol ferry disaster and the MERS crisis. First of all, the Korean government lacked early response and prior preparation which could prevent Sewol ferry disaster and MERS crisis in advance. Second, appropriate alarms or information were not provided. Third, government departments lacked cooperation. Fourth, the public's trust in governmental response was gone. To prevent further disaster, immediate release of accurate information shall be prioritized and anti-corruption system shall be established for trust in the government and safety.

III. Case Study of MERS

1. Case Overview

MERS is an acute respiratory infection caused by human infection and it has been developing in the Middle East regions such as Saudi Arabia since April, 2012. According to European Centre for Disease Prevention and Control total of 1,142 patients were infected and 465 patients died in 23 nations such as Europe, except Middle East regions. Among the infected patients, 97.8%(1,117) patients got infected in Middle East Regions such as Saudi Arabia or United Arab Emirates and the disease made people all over the world get terrified(Lee, 2015: 41). According to the World Health Organization(WHO) announcement, on May 27, 2015, a Korean who contacted confirmed MERS patient entered Huizhou City, Guangdong Province through Hong Kong(Sina.com, 2015). Around 2 A.M. on May 28, 2015, the contact was isolated. On May 29, he was confirmed of MERS and became the first confirmed MERS patient in Guangdong Province. By June 2, 2015, out of the 78 contacts of the confirmed patient, the Guangdong provincial government detected 75 people excluding 3 people who left the country and the government isolated the contacts. On June 10, 75 contacts have been released from quarantine after 14 days of examination. The confirmed MERS patient from Korea completed examination on June 19 and June 25 and got discharged from the hospital after full recovery from MERS. On June 26, he went back to Korea.

2. Analysis of Guangdong Provincial Government' s Disaster Management Measures

Regarding prevention method and legal system,

on November 27, 2003, the Guangdong provincial government enacted the 〈Emergency Regulations for Public Health Emergencies in Guangdong Province〉 on the basis of 〈Emergency Regulations for Public Health Emergencies〉. In 2007, Guangdong provincial government implemented 〈Emergency Regulations for Public Health Emergencies in Guangdong Province〉 enacted based on 〈Emergency Plan for Public Health Emergencies〉. Guangdong provincial government enacted the two regulations in accordance with the actual situation in Guangdong based on the laws enacted by the nation.

The following paragraphs are analysis on Guangdong provincial government's MERS response process in 5 aspects: report and response, transfer and isolation of patient, patient treatment and information gathering, contact tracing and management, information sharing and communication.

1) Report and response

At 22:00 on May 27, 2015, department of medical Health got report from National Medical Health Center that one Korean who has symptom of fever after contacting the confirmed MERS patient passed Hong Kong and entered Huizhou City, Guangdong. Department of medical health in Guangdong started the disease prevention center of crisis response system operation and sent three epidemic experts to Huizhou City. The three experts formed joint working group of province and city to provide precise risk assessment and to divide roles for each person in charge. The experts also collected the latest information from WHO and from national or local disaster management departments through mobile, Internet, and e-mail reports. In addition,

the experts designated specialized hospital and requested ambulance. The experts also found the hotel the contact was staying by requesting to overseas affair bureau. Around 2 A.M on May 28, Huizhou medical health department found the contact only four hours after the report and transferred the contact to designated MERS treatment hospital.

2) Transfer and isolation of patient

The joint working group was divided into 3 work teams: investigation on infectious disease, site disinfection, and control of contact. The joint working group prepared overall MERS treatment plan and went to hotel where the contact was staying at. The work of the joint working group included information exchange with hotel managers, designation of interpreter for patient, call with patient, identification, grasping the patient's symptom and travel record, disinfection of hotel room and public places, and isolation of contact. Around 2 A.M on May 28, the contact as transferred to ICU isolated ward at Huizhou central hospital.

3) Patient treatment and information gathering

After the contact was isolated, the joint working group shared information with doctors and checked the hospital's disease infection prevention performance with technical equipment. Around 5 A.M on May 28, the hospital analyzed the patient's blood sample and sent the blood sample to Chinese Center for Disease Control and Prevention. Such measures allowed the overall blood sample analysis on disease prevention and control in the level of city, province, and nation. After blood sample

analyzed, the patient was confirmed of MERS. Also, the patient's moving path was investigated and the patient's father and sister were the 3rd and 4th confirmed MERS patient. On May 16, the patient visited his father who was in St. Mary's Hospital in Pyeongtaek, Korea. The patient and his sister stayed in the same ward with the first confirmed MERS patient in Korea. On May 21, the patient had muscle pain and got treated in hospital at Osan-si. Although the patient took a painkiller, the symptom continued. In the evening of May 25, the patient visited the hospital again due to headache and fever. Then, the doctor told the patient that his father and sister were diagnosed of MERS. Although the doctor suggested the patient to get treatment in Seoul, the patient left Korea without additional treatment and entered Huizhou City, Guangdong. According to investigation on the patient's moving path, the patient attended one business conference, stayed in two hotels, and had meal at two restaurants.

4) Contact tracing and management

The Guangdong provincial government started to find people who contacted patient based on the patient's moving path. The government confirmed 59 contacts who together with the patient in conference, hotels, and restaurants. On May 30, the government isolated all contacts except for one who left the China. Then, the government request citizens, foreigner affair bureau, traffic department, and public safety department for cooperation to collect passenger information for the flight and express the patient used. Until June 4th, 78 contacts were identified and the Guangdong provincial government isolated 75 contacts except

for 3 contacts who left China and observed the contacts for 14 days. After 14 days, all isolated contacts had normal figure and the contacts were discharged from the hospital.

5) Information sharing and communication

In the process of responding to MERS crisis, national and Guangdong department of medical health informed the public on the patient’s daily condition, MERS prevention and control situation since March 28 when the suspected case was found.

To trace contacts, the government used the traditional information and communication methods such as TV, newspaper, and radio while also using new media such as SNS and Internet home page to provide and collect real-time MERS information from the public. Among information sharing methods in new media, Guangdong department of medical health shared information by using Wechat, the No.1 SNS program in China. The information shared on May 29 had over 100,000 views in a day.

3. Comparison with Korea

1) Comparison in number of patients and infected person

In MERS crisis, Korea had no measures against the possibility of domestic inflows even though large number of MERS patients died in Middle East regions. The Korean government also failed in initial response and did not reveal accurate information to the public. The Korean government departments also were not in harmony and lacked understanding on the dangerousness of situation(Lee, 2015: 38). Following <Table 1> compares the date of first confirmed case, number of quarantined patients, number of confirmed cases, and deaths. In Korea, the first confirmed case was found on May 20, 2015. The MERS crisis started in Korea when the 68-year-old man came back from Bahrain with MERS(Yonhapnews, 2015.5.20). In China, the first confirmed case was found in May 26, 2015 which is 6 days after Korea. The first confirmed case was a 44-year-old Korean man who entered China for business and his father and sister were the 3rd and 4th confirmed cases in Korea. After MERS crisis, 6729 suspected

Table 1. Comparison on the number of patients in China and Korea

China		Korea
May 26 th , 2015	date of first confirmed case	May 20 th , 2015
a visitor from Korea	first confirmed case	a visitor to Bahrain
June 10 th , 2015	date of last isolation	July 28 th , 2015
15 days	duration of MERS	69 days
75	quarantined	6729
1	infected	186
0	death	38

※ Source: Baidu.com & Namu.wiki.

patients were quarantined, 186 patients were diagnosed of MERS, and 38 patients died. On July 28, Prime Minister Kyo Ahn Hwang declared 'MERS crisis is over in Korea'. It took 69 days for Korean government to declare end of crisis after the date of the first confirmed case. In China, 75 suspected patients were quarantined and there was no confirmed case except for the first imported patient. Also, no patient died from MERS. On June 11, Guangdong provincial government released the last contact and MERS crisis was over in China. In short, it took 13 days for Guangdong provincial government to discharge all contacts after the date of suspected patient.

2) Comparison in government response

The Chinese government and Korean government had different response attitude toward MERS crisis. The followings are the two government's response process in information sharing and promotion of prevention information.

(1) Information sharing

In MERS crisis, the Chinese government and Korean government had different measures for information sharing. On May 26, the first suspected MERS patient occurred in China and he was diagnosed of MERS on May 29. At 7 P.M., the department of medical health notified the citizens of the confirmed case's flight number and time, express bus time, and bus number and searched for the contact through TV, radio, newspaper, internet, and mobile(QQ.net, 2015). Also, the participants of business conference where the confirmed case was at were all searched and isolated on May 30. People who contacted the confirmed case

at the flight or express bus were isolated on June 1st and June 4th(People.cn, 2015). In addition, the Guangdong provincial government shared the moving path of the confirmed case and shared the hospital where he was treated. Chinese media had interviews on Guangdong citizens and the citizens said 'At first, we were terrified and worried about MERS crisis. However, after hearing from government, we are not worried anymore'(Lifetimes, 2015).

In contrary, the Korean government failed to share the information promptly. On May 20, the media reported that a suspected patient was diagnosed of MERS and that the confirmed cases are increasing. Although the citizens were in panic, the media did not reveal the hospitals where MERS patients were treated and referred to the hospitals as 'Hospital A' or 'Hospital B'. The citizens requested the government to open the hospital lists and the Korean government declared to not reveal the lists to prevent excessive panic and anxiety. Such governmental decision caused adverse effects. On June 7th, the Korean government revealed the hospital list from public outrage toward government. However, the revealed hospital list had errors first time and caused more distrust in the government(YTN, 2015).

(2) Promotion of MERS prevention measure

On June 1st, Chinese Preventive Medicine and Public Health announced prevention measures for citizens 3 days after diagnosis of MERS patient. According to the prevention measure, the origin of MERS is Middle East regions and confirmed cases all have been to Middle East regions or contacted people who had been to Middle East. The prevention

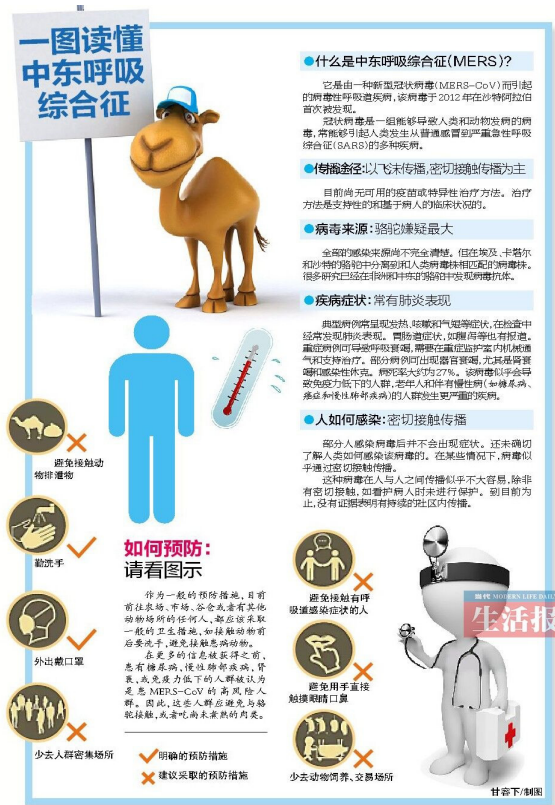
measure also suggested that the risk of infection is very low when a person has no experience of going to Middle East regions or contacting animals like camel(Gxnews, 2015).

In Korea, the outbreak and spread of MERS was relatively fast as the citizens had little information about MERS and health authorities lacked preparation for new infectious respiratory disease coming from overseas. Although Korea faced national crisis due to uncertain information in the early stage of MERS crisis, health authorities' announcement for the public was limited to personal hygiene level(Oh, *et. al.*, 2015: 168). Furthermore, the Korean government's MERS prevention measure caused a lot of controversy. Korean health authorities announced that 'All patients are related to Middle East regions directly or indirectly' and came up with the case of visit to camel market or camel farm. However, it is difficult to contact camel in Korea and camel meat is not imported to Korea. Thus, the public's attitude toward the government's measures was skeptical(Segyeilbo, 2015).

To prevent the spread of infectious diseases, it is important for each individual to carry out active prevention measures and participate actively in spread preventive measures. In Korea, however, the Korean government sets the eventual measure and delivers it to the private hospitals and experts. Then, the private sector takes measures for the infectious diseases. Thus, citizens cannot participate in preventive measures properly in the outbreak of infectious disease(Choi & Cho, 2017: 3).

IV. Conclusion

This study analyzed the Chinese disaster



※ Source: Modern Life Daily, 2015.

Figure 3. Introduction and prevention of MERS in China



※ Source: Ministry of Health and Welfare & Facebook, 2015.

Figure 4. Prevention of MERS by Ministry of Health and Welfare in Korea

management system and medical health disaster management system. This study also compared Guangdong provincial government and Korean government's response to disaster management.

The result showed that there is not much difference between Chinese government and Korean government in their awareness toward disaster management activities, importance of disaster management activities, safety consciousness, and safety pursuit behaviors. In fact, there is a research result that the Chinese and Korean university students have similar awareness toward disaster and safety. Regarding disaster management activities, Korea and China had positive attitude toward importance of prevention, preparation, response, and recovery. Especially, both Korea and China put importance in response to disasters(Lee & Lee, 2012: 138–139).

It may be difficult to make the crisis under control once the medical health crisis is worsened and spread. Therefore, people should put emphasis on prior prevention and response to minimize the damage from medical health crisis. To minimize the damage, domestic and overseas public institutes, citizens, and private medical institutes should cooperate and the institutes and media should cooperate in establishing the national disaster response and management governance through broad and prompt information sharing. Through such measures, a nation should have a social atmosphere and culture of protecting the nation, society, and individual from infectious disease and other disasters(Choi & Cho, 2017: 14). The Chinese government and Guangdong provincial government were fully aware of the MERS crisis's dangerousness and implemented prompt then taken a series of effective response measures to minimize the patient and damage. On the other hand, the Korean government failed to put emphasis on dangerousness of MERS crisis and failed to

implement effective response measures. Such failure resulted in huge damage on economy and citizens.

To analyze Guangdong provincial government's medical health disaster management process during MERS crisis, this study divided the process into 5 stages: report and response, transfer and isolation of patient, patient treatment and information gathering, contact tracing and management, information sharing and communication. The analysis result showed that Guangdong provincial government's medical health disaster management process involved joint participation of central government, local government, and citizens. The central government was in charge of enactment, policy enforcement, and overall instruction in the national level. Also, the local government was in charge of detailed enforcement of responses and citizens participated actively with responsibility. As the three parts jointly participated, cooperated, and trusted each other, MERS crisis in China could be handled promptly and effectively with minimum damage.

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References

Communist Party of China. 2003. The Decision of the CPC Central Committee on Improving the Socialist Market Economic System.

- Fei, *et. al.* 2015. Problems and Strategies of China's Overseas Public Crisis Communication. *Journal of the Party School in Fuzhou*. 4: 44-47.
- Ge, Xiaohui. 2015. MERS in South Korea 2015: Analyses and Reflections. *Collected Papers for Korean Studies*. 30(2): 245-263.
- Jeong, Yoon Jin and Sun Choi. 2017. Government's Cognition of Security and Crisis Management System: SARS and MERS Cases. *Journal of Korean Politics*. 20(2): 133-157.
- Lee, Jing and Jae Eun Lee. Comparative Analysis of the Disaster and Safety Perception between China and Korea. 2012. *Crisisonomy*. 8(4): 125-142.
- Liu Gongzhi. 2004. Guidelines for the Preparation of Emergency Management Plans. *Labor Protection*. 4: 11-18.
- Park, Haemi and Daejung Kim. 2017. Exceptional Health Situation and Crisis Avoidance: Focusing on the Infectious Disease Emergency Preparedness and Response System in France. *Crisisonomy*. 13(8): 13-26.
- Qiu, *et. al.* 2017. Application of WHO Risk Communication Principle in Management of First Case of Imported Middle East Respiratory Syndrome in China. *Chinese Journal of Public Health*. 33(2): 234-344.
- Song, *et. al.* 2015. Emergency Response to the First Imported Case of Middle East Respiratory Syndrome in China. *South China Journal of Preventive Medicine*. 41(4): 303-306.
- The State Council of the People's Republic of China. 2003. Emergency Regulations for Public Health Emergencies.
- The State Council of the People's Republic of China. 2006. The State Council's Opinions concerning Strengthening Emergency Management Work in an All-Round Way.
- The State Council of the People's Republic of China. 2018. Institutional Reform of the State Council.
- Wang Longde. 2008. *Emergency Management of Public Health Emergencies: Theory and Practice*. Beijing: People's Medical Publishing House.
- Zhong Kaibin. 2009. A Framework for the Emergency Management System of China. *Social Science in Nanjing*. 11: 77-83.
- Gxnews. 2015. <http://www.gxnews.com.cn/staticpages/20150610/newgx55781d87-12974098-1.shtml>
- Lifetimes. 2015. <http://bbs.haier.com/forum/mama/1744728.shtml>
- People.cn. 2015. <http://politics.people.com.cn/n/2015/0605/c7073-1-27111447.html>
- QQNET. 2015. <http://gd.qq.com/a/20150529/068445.htm>
- Segyeilbo. 2015. <http://www.segye.com/newsView/20150921003459>
- Sina.com. 2015. <http://news.sina.com.cn/o/2015-05-29/022031889025.shtml>
- Xinhuanet. 2015. http://www.xinhuanet.com/politics/2015-06/09/c_127897120.htm 2015.06.09.
- Yonhapnews. 2015. <http://www.yonhapnews.co.kr/bulletin/2015/05/20/0200000000AKR20150520121851017.HTML?input=1195m> 2015.5.20.
- YTN news. 2015. http://www.ytn.co.kr/_ln/0103_201506071001341733

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Profiles **Long Tian An** : He received his M.A. from Jilin University, China and is now a Ph.D. course student in Department of Public Administration at Chungbuk National University, Korea. His interesting areas are crisis and emergency management, disaster management, and so on(anlt@cbnu.ac.kr).

Jae Eun Lee : He received his B.A., M.A., Ph.D. from Yonsei University, Korea in 2000. He is a Professor of the Department of Public Administration at Chungbuk National University, in which he has taught since 2000. His interesting subject and area of research and education is crisis & emergency management, organizational studies, and policy implementation. He has published 146 articles in journals and 15 books, including 15 co-author books(jeunlee@cbnu.ac.kr).

Joong Kook Choi : He received his Ph.D. from Iowa State University, USA in 1996. He carried Post-Doctor program (1997-2001) and Instructor(2001-2003) at Harvard Medical School. He is a Professor of the Medical School at Chungbuk National University, in which he has taught since 2003 (jkchoi@chungbuk.ac.kr).