

Challenges in the Korean Medical System after the End of the MERS That Hit Korea In 2015

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Abstract

Background/Objectives: Middle East Respiratory Syndrome(MERS) is caused by the MERS-Korona virus, a type of beta-corona virus, is a serious respiratory disease with numerous reported. The purpose of this study was to provide a comprehensive review of MERS in Korea in 2015 and use it as basic data for preventing future infectious diseases in Korea.

Methods/Statistical analysis: This study was designed by the authority. The research material, after MERS-CoV's declaration of an end, the authorities searched the website of a reputable organization in Korea for a proven report on MERS-CoV.

Findings: Of 111 male patients and 75 female patients with laboratory-confirmed MERS-CoV infections between May 20, and July 13, 2015, total 38(20.4% fatality rate) case died. The most common causes of infection occurred in hospital visits and hospital admissions. 82 (44.1%) patients; 64(34.4%) were patients' family, caregivers, or visitors; 39(21.0%) were healthcare personnel, and one(0.5%) case was of unknown origin. It was associated with 16 medical institutions, most of them related to medical institutions.

Improvements/Applications: Judging by this nature, isolation in the hospital of the initial and estimated superconductors is paramount and is an important criterion for prevention and isolation in the future 'Management and Countermeasures of Infectious Diseases'.

Keywords: coronavirus, Korea, MERS-CoV, respiratory disease, outbreak

1. INTRODUCTION

There has been a decrease in epidemics and associated mortality, but it remains a major threat. In the 21st century, we continue to fight for hundreds of years with new pathogens like the plague that afflicts humanity, and the human immunodeficiency virus (HIV). Infectious diseases such as malaria caused by mosquitoes and tuberculosis that have recently occurred in Korea a substantial but steady burden on them. Others, such as

influenza, have a rapid increase in prevalence and intensity, in both developing and developed countries, such as a rapid increase in populations or areas with larger populations or an epidemic that encompasses multiple countries or continents. Even now that medicine has developed and vaccine technology has advanced, infectious diseases come as a tremendous fear. The rapid spread of infectious diseases has also increased due to the development of traffic and the rapid increase of people-to-people movement.

The WHO defines the 21st century as the age of infectious diseases, and the stage of the epidemic alert is divided into six stages. Stage 1 - Between Animals, Stage 2 - Between Minorities, Stage 3 - Intercommunication between Multiple People, Stage 4 - Early conditions in which a global pandemic could occur, Stage 5 - Human infections in at least two countries, human infections in more than six - Stage 2 countries. The threat of infectious diseases and the resulting fear and panic are related to a variety of economic and social risks. There are obvious costs associated with the outbreak of infectious diseases in terms of care for health care systems and outbreak management. Important events can overwhelm the health system, limiting the ability to handle other daily health problems, adding to the stress on the system.

In addition to its impact on the health sector, infectious diseases disrupt productivity by making sick people and caregivers unemployed or less effective at work. When important human resources such as engineers, scientists, and physicians are affected, the impact on productivity can be magnified. [1,2].

Who divides the stage of the infectious disease crisis into a total of six stages, four stages of severe acute respiratory syndrome (SARS)[3] for 2002 and 2003 and six stages of a new swine-origin influenza virus (S-OIV)[4] for 2009. One of the most recent new infectious diseases in the Korea was MERS. MERS (MERS) is caused by the MERS-Korona virus (MERS-CoV), a type of beta-corona virus, and the infection route is known as close contact. In the early 21st century, SARS (SARS), an infectious disease that caused the same coronavirus that hit the world, is compared with the same strain of the virus. In fact, there is no preventive measure at all. Saudi Arabia, a closed-door Muslim kingdom, is the origin of the kingdom, but there has been a steady death toll in the Middle East, especially in the Arabian Peninsula. Corona virus (MERS-CoV) after Middle East respiratory syndrome was isolated from severe pneumonia patients in September 2012 [5].

The MERS-CoV can survive more than 48 hours at 20° C and 40 per cent of relative humidity, indicating that contact or parasitic propagation in the medical environment can occur. The MERS-CoV was detected by rRT-PCR in samples taken from medical equipment. MERS-CoV also indicates extensive contamination of the separators by separating them into cell cultures of air and swab samples taken from the MERS separators [6-10]. In epidemiology, the basic number of gametes of infections (sometimes referred to as the base reproductive rate or incorrect primary reproductive rate, also referred to as R_0 , distinct R naught, or R zero) was SAS 4 and MERS was 0.4 to 0.9, meaning that an infection would spread from one infected person to more than one person if the R_0 was greater than one in an infectious population [4]. Death rates are a key factor along with infection. Since September 2012, WHO has reported 574 deaths out of 1,599 confirmed cases of MERS-CoV worldwide, showing a death rate of about 35.89 percent[11]. The global MERS outbreak from 2012 to 2018 put the No. 1 Saudi Arabia, No. 2 United Arab Emirates and No. 3 South Korea on the list, with 750 deaths reported in a total of 27 countries[12,13]. In 23th December 2015, WHO and the Ministry of Health and Welfare declared an end to MERS in South Korea because no more confirmed cases were reported. No new cases emerged after July 28, 2015, and the outbreak threat level was reduced from 'yellow' to 'blue' on December 1, 2015[14].

The purpose of this study was to provide a comprehensive review of MERS in Korea in 2015 and use it

as basic data for preventing future infectious diseases in Korea.

2. MATERIALS AND METHODS

This study was designed by the authority. The research material, after MERS-CoV's declaration of an end, the authorities searched the website of a reputable organization in Korea for a proven report on MERS-CoV. Authoritative organizations were the Ministry of Health and Welfare, the Korean Centers for Disease Control (CDC).

3. RESULTS AND DISCUSSION

The first patient (index case) infected with MERS-CoV came back from the Middle East as a 68-year-old Korean. He said he visited the Middle East on business, was in the United Arab Emirates and Saudi Arabia and returned to Incheon International Airport via Bahrain Airport on FROM April 24 TO May 4, 2015. He had a fever and muscle ache just seven days after returned home on May 11. He visited a private CLINIC, but he did not make any progress, so he visited secondary medical institution, St. Mary's Hospital in Pyeongtaek, Gyeonggi Province. On May 15, a photo of chest radiation confirmed pneumonia and referred it to Samsung Medical Center(SMC), a third medical institution affiliated with a university in Seoul on May 17.

The results of a request from the Korea Centers for Disease Control and Prevention to confirm the MERS virus were positive on May 20. The spread of the disease began in the hospital on May 17-20 because he was hospitalized at a secondary medical institution (Pyeongtaek St. Mary) for three days before the MERS outbreak was confirmed. [15-18]. Between May 20, and July 13, 2015, 186 people were confirmed by virus tests and 38 of them were killed (the death rate is 20.4 percent). 111 (59.7%) and 75 (40.3%) were male and female patients, respectively [Figure1].

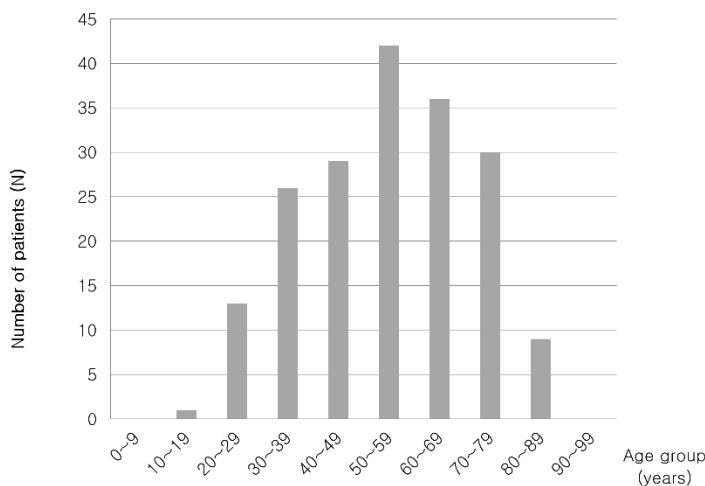


Figure1.Basic characteristics of 186 confirmed cases of MERS-CoV infection in the Republic of Korea.

82 (44.1%) were exposed during hospital admission or at clinics; 64(34.4%) were patients' family, caregivers, or visitors; 39(21.0%) were healthcare personnel, and one(0.5%) case was of unknown origin[Table

1].

Table 1. Transmissions type among diagnosed patients

Total	In-patients	Caregivers /Visitors	Health care personnel								Others
			Doc tor	Nur se	Radiol ogist	Tran sfer agent	The ambula nce service	Careg ivers	Securi ty guard	Compu ting firm	
186	82	64	8	15	2	1	2	8	2	1	1*
100	44.1	34	4.3	8.1	1.1	0.5	1.1	4	1.1	0.5	0.5

Samsung Medical Center(SMC) has the largest number of hospitals with MERS infections at 60, followed by Pyeongtaek St. Mary's Hospital. Patient No. 1 of patients. No. 1, 14 and No. 16 who are believed to be superdelegates were admitted to St. Mary's Hospital in Pyeongtaek and Samsung Medical Center on May 15 and 17, respectively, before confirmation. Thirty-six patients have been confirmed at Pyeongtaek St. Mary's Hospital since May 20. Patient No. 14 also visited Samsung Medical Center on June 27, and the hospital has reported 60 patients so far, indicating a sharp increase in the number of patients since the discovery of one patient on June 4. Patient No. 16 was admitted to Daecheong Hospital in Daejeon on May 25 and Konyang University Hospital in Daejeon on May 28 and the two hospitals reported a total of 17 patients infected from June 1 to June 12. Many patients(96.2%) infected with MERS were those hospitalized and there were super waves at 16 medical institutions [Table 2]. Up to 83 percent of the people were infected by five people known as superdelegates[19].

Many people were exposed to super spreader -1 in the emergency room. Exposure to super spreader -1 resulted in 82 cases of MERSCoV confirmed in the laboratory and an additional 10 cases of secondary infection [20,21]. In PTSM hospital, an outbreak in Daejeon(100 kilometers south of Pyongtaek City) was infected (Super Spreader -2). She was admitted to Daecheong Hospital two days after experiencing symptoms on May 20. Despite the treatment, she was taken to konyang Hospital as pneumonia progressed after 1 week later and additional 25 cases of secondary infection(14 Daecheong hospitals, 11 Konyang hospitals) have been detected. The super spreader -2 caused two hospital outbreaks, The death rate reached 28.6 percent in Daecheong hospitals and 63.6 percent in Konyang hospitals. The WHO Western Pacific Regional Organization(WPRO) announced on July 28, 2015 (Philippines Manila time) that its strengthened public health measures have controlled the MERS situation in Korea and the new influx of MERS-CoV. Emphasis was placed on the establishment of a vigilant and communicable disease response system. On the other hand, the Ministry of Health and Welfare believes that the possibility of additional transmission at WHO as of October 29, 2015 is significantly lower[22].

The confirmed MERS patients in South Korea are showing symptoms of infection centered on patients visiting and staying at medical institutions. This shows the characteristics of a superconductor known as the main infection route for MERS patients in Jeddah, Saudi Arabia, in 2014 and an infection path similar to that in hospitals[11]. In addition, Korea alone, which operates beds in multi-person rooms under national health

insurance, was a unique spread due to the unique characteristics of medical institutions, patient's hospital and doctor's shopping and the frequent culture of visiting families and relatives[21]. Judging by this nature, isolation in the hospital of the initial and estimated superconductors is paramount and is an important criterion for prevention and isolation in the future 'Management and Countermeasures of Infectious Diseases'.

Table 2. Healthcare facilities at which MERS patients were diagnosed and treated

Province	City	Hospital (place)	Number of patients
Seoul	Youngdeungpo-gu	The Catholic University of Korea, Yeouido(ER)	1
	Gangdong-gu	365 Seoul YeollinClinic (outpatient)	1
		KyungHee University Hospital at Gangdong(ER, inpatient)	5
	Gangnam-gu	Sansung Medical Center	90
	Songpa-gu	SongtaeuiInternal Medicine(outpatient)	1
		AsanMedical Center (ER)	1
Kwangjin-gu	Konkuk University Medical Center (ER, inpatient)	4	
Pusan	Sooyoung-gu	Good GanganHospital (ER, outpatient, inpatient)	1
Daejeon	Seo-gu	Dae-Chung Hospital (inpatient)	14
		Konyang University Hospital (ER, inpatient,cafeteria)	11
Gyeonggi	Pyungtaek city	Pyeongtaek St. Mary's Hospital	37
		Good Morning Hospital	4
	Hwaseoung city	Hallym University Medical Center	6
	Youngin-gu	Yangji Seoul Samsung Medical center (outpatient)	1
Chungnam	Asan city	Seoul Clinic (outpatient)	1
		Chungmu Hospital (inpatient)	1

Epidemic was a historical event that threatened human life. The recent expansion of travel and trade has contributed to the spread of new infections. Geographical distance no longer impedes transmission of infectious diseases[20]. To prevent the spread of MERS-CoV in medical institutions, infection prevention and control measures are important. Early identification of MERS-CoV infected patients is not always possible because the initial symptoms, like other respiratory infections, are unusual. Therefore, health care workers should apply consistent standard precautions to all patients. Follow general hygiene measures, such as regular hand washing. [19].

Now MERS is over and the fear of that time is much forgotten. Dental clinics and hospitals, in particular, have a very vulnerable structure for non-maligned transmission through hand pieces and scalers, so they should be made a living by organizing and fulfilling the existing epidemic of new infectious diseases at domestic and abroad.

4. CONCLUSION

In 2015, 38 deaths were reported in Korea about 186 MERS infection cases [19]. Generally, the public said there was no need to worry about additional infections in everyday life. The government should continue to take steps to prevent new infectious diseases such as MERS. To prevent the spread of MERS-CoV in medical institutions, infection prevention and control measures are important. Therefore, health care workers should apply consistent standard precautions to all patients.

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