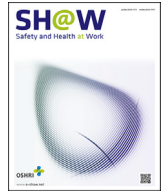




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## Editorial

# COVID-19 and MERS Infections in Healthcare Workers in Korea



### Keywords:

COVID-19

HCWs

healthcare workers

MERS

occupational disease

Outside of China, Korea was the first country to face a peak explosion of the COVID-19 global pandemic situation. On January 20, 2020, a Chinese who arrived from Wuhan, China, was detected for the first case of COVID-19 in Korea [1], and the outbreak started from the 31st case in Daegu Province in the third week of February. The Korea Centers for Disease Control and Prevention (KCDC) have tracked all cases [2]. All possible case contact people were identified, and polymerase chain reaction (PCR) tests for COVID-19 were performed to confirm cases of infection. The positive cases were admitted to a special room equipped with negative pressure ventilation. The case contacts who were shown to be negative for the COVID-19 PCR test were requested to be in isolation for 14 days; thereafter, they were retested for COVID-19. The Korean prevention strategy was strengthened when the 31st case was reported and several hundred cases were identified in an unorthodox church located in Daegu, in the south of the Republic of Korea. The many possible cases were church congregants, who then spread the COVID-19 infection throughout the country.

As of April 5, 2020, the KCDC reported that there were 241 COVID-19 cases (2.4%) in healthcare workers (HCWs), among a total of 10,062 positive COVID-19 cases from 443,273 tested with PCR. Of the 241 cases in HCWs, 101 had been infected at work. No one was infected during treatment. (Table 1). There were 11 doctors, 82 nurses, and 8 other HCW categories. The proportions of HCWs and HCWs who were occupationally infected among all cases of COVID-19 were 2.4 and 1.0%, respectively. This proportion is substantially lower when compared with the cases reported for the Middle East respiratory syndrome (MERS) outbreak in 2015 [3]. During the MERS outbreak, the percentage of HCWs who were infected at work was 21.0% (39 cases) of all MERS cases (186) in Korea. The HCW categories were physicians (8), nurses (15), caregivers (8), radiographers (2), and other HCWs (6). They were infected in outpatient clinics, emergency rooms, intensive care units, wards, radiographic chambers, and even in ambulances.

The basic reproduction number ( $R_0$ ) of COVID-19 ranges 2 to 5.7, which is higher than that of the severe adult respiratory syndrome ( $<2$ ) and MERS ( $<1$ ) [4]. The relatively lower rate of COVID-19 in HCWs is quite significant in occupational health, in view of the fact that COVID-19 is known to be more contagious than MERS. This observed lower rate of infection can be attributed to prevention actions and protocol designed for HCWs, based on the experience and lessons learned from the MERS outbreak. First, during the MERS outbreak in 2015, respiratory patients with fever, who possibly had a highly contagious disease, were treated with other patients at outpatient clinics and emergency rooms on arrival at hospitals or clinics. At that time, HCWs did not have any information on the possible infection and they did not know with whom their patients had had contact. Second, when confirmed cases were found, there was no way of knowing who the case contacts were unless the patients were honest in their descriptions of possible contacts and if they did not have a recall bias. At that time, the tracking of possibly infected contacts was impossible due to the enforcement of the Personal Information Protection Act. After the MERS outbreak, the relevant Acts were amended so that the epidemiological team is now able to track and trace the route of confirmed cases to let people know whether they may have had contact with a possible source of infection [5]. Lastly, HCWs were not well versed or trained in good practices and the proper use of personal protective equipment. HCWs were in direct contact with patients without wearing the adequate personal protective equipment, such as masks, until well after the MERS infection was already widely spread. A health mask, KF94, which is equivalent to the N95 mask in the USA, was used only when seeing patients presenting at the infectious diseases departments. A national action plan for preventing endemic diseases was established only after the MERS outbreak. In hospitals, virtual training exercises had been periodically carried out using a scenario of a highly contagious patient referred or identified during a diagnostic process.

Although the number of COVID-19 cases has been steadily decreasing, there is no way of knowing if the pandemic in Korea

**Table 1**  
The status of COVID-19 infection in healthcare workers in Korea as of April 5, 2020

Source of infection		Cases	Physicians	Nurses	Other HCWs	
Occupational infection	Treatment for confirmed cases	0	0.0%	0	0	
	Screening tests	3	1.2%	1	2	
	General treatment	66	27.4%	6	57	
	Outbreak in hospitals	32	13.3%	4	23	
	Subtotal	101	41.9%	11	82	
Nonoccupational infection	Community infection	101	41.9%	7	76	
	Unknown source	26	10.8%	5	21	
	Subtotal	127	52.7%	12	97	
Still under investigation		13	5.4%	2	11	
<b>Total</b>		<b>241</b>	<b>100.0%</b>	<b>25</b>	<b>190</b>	<b>26</b>

is nearing the end. However, many prevention actions and protocols have been established and implemented, based on the experience of COVID-19 since the first case was reported in January, followed by the massive outbreak in February. We can anticipate that the protection measures implemented for HCWs during this outbreak situation have been successful, even though there may be other reasons for the low rate of COVID-19 infections observed in HCWs in Korea.

The important points in terms of the observed low rates of COVID-19 infection in HCWs are (1) Segregation of potentially infected patients by operating a separate screening area for those patients who present with fever or respiratory symptoms. Patients suspected of having COVID-19 infection are submitted to PCR testing and sent to a dedicated room equipped with negative pressure ventilation if they have pneumonia or pneumonia symptoms, until confirmation can be obtained from the PCR test results. Separating the infected patients can prevent infection of HCWs and other patients, and it can reduce the burden of the workload experienced by HCWs. (2) Identification of infected patients through a massive, proactive case-finding and testing exercise for COVID-19 infection (test, trace, and treat) [6]. Identifying infected persons through a rapid test is very effective in preventing further transmission to people with whom the infected patients may have had close contact. (3) The good practice of wearing a mask, by HCWs and patients alike. The practice of patients wearing a mask may prevent HCWs from becoming infected by their patients during medical procedures. (4) All hospital staff and visitors are required to have their body temperature checked every day when entering the hospital premises. (5) Hand sanitizers have been provided throughout hospitals and other clinical settings. Other infection prevention actions have been taken in combination with the aforementioned good practices; these include frequent hand washing, social distancing in the seating arrangements in canteens and after work, temporary closure of public rooms such as change rooms and common meeting areas, postponement or cancellation of face-to-face meetings or conversion of these meetings to web-based communication events, and so on.

Preventing infection of HCWs is a critical aspect of national response and very important for the duration of any pandemic [7]. Infection of HCWs will lead to reduced medical manpower and inadequate medical care of patients. Korea can ensure the efficiency and sustainability of its healthcare system during the COVID-19 pandemic first and foremost by keeping its HCWs safe and healthy.

## Conflicts of interest

The author declares that there is no conflict of interest.

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