Perspective

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Characteristics of the COVID-19 Outbreak in Korea From the Mass Infection Perspective

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On December 31, 2019, the Chinese government officially announced that the country had some cases of pneumonia with an unknown cause. By February 8, 2020, there were 24 confirmed cases in Korea, and the number of cases has steadily increased since then. On March 9, 2020, the cumulative number of confirmed cases in Korea was 7382, with 51 deaths. This study examines the characteristics of the coronavirus disease 2019 (COVID-19) outbreak from the perspective of the large-scale number of confirmed COVID-19 cases and deaths. This study is significant in that it emphasizes the precautionary principle in preventing and managing infectious diseases, and makes suggestions for urgently needed public health policies.

Key words: COVID-19, Group meetings, Massive infection, Perspectives, Prevent, Religious services

On December 31, 2019, the Chinese government officially announced that the country had some cases of pneumonia with an unknown cause. It is not clear when the first case of this new infectious disease occurred. According to a report published by medical teams in Wuhan, China analyzing 41 confirmed cases (from December 1, 2019 to January 2, 2020), the first patient developed symptoms on December 1, 2019, but had never visited the Huanan Seafood Wholesale Market [1]. The World Health Organization temporarily named the virus the 2019 novel coronavirus, and then established a naming convention according to which the causative virus is known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease is known as coronavirus disease 2019 (COVID-19); however, as the original English name is rather long in Korean, the Korean government decided to call it "Corona 19 (*Corona il-gu*)," following the opinion of the Korea Centers for Disease Control and Prevention (KCDC) [2]. The first death from COVID-19 was reported on January 10, 2020 in China. After that, Japan reported the first case on its territory on January 15, 2020. Korea followed suit, with a case on January 20, 2020. On February 8, 2020, the number of confirmed cases in Korea reached 24, and the number of patients is still increasing [3]. Coronaviruses are a family of viruses that can infect humans and other animals. They are RNA viruses with genome sizes ranging from 27 kb to 32 kb, with four genera (alpha, beta, gamma, and delta). The alpha and beta genera can infect humans and animals, while the gamma and delta genera infect only animals other than human beings. As implied by their name—as "corona" is Latin for "crown"—when observed on electron microscopy, these viruses have a crown shape with characteristic protein spikes attached to a ball. The causative pathogen of COVID-19 is known as SARS-CoV-2, and its ultimate reservoir is thought to be an animal, although research is still ongoing. The most likely transmission route is considered to have been animal→human→human. Spread between humans is assumed to occur through droplets. Cases of secondary infections in

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households and hospitals have been confirmed. The principal clinical manifestations of COVID-19 are fever, respiratory symptoms (coughs and dyspnea), and pneumonia [4].

The KCDC reported case #31 of COVID-19 at 10:00 a.m. on February 18, 2020. A woman in her 60s living in Daegu, case #31 had been admitted to a hospital in Daegu at the time. She had attended a service at Shincheonji Church in Namgu, Daegu, on February 9, 2020 and February 16, 2020, each for 2 hours. After this first confirmed case associated with the Shincheonji Church in Daegu (case #31), the number of cases associated with the Shincheonji believers in Korea increased sharply. On March 9, 2020, the cumulative number of confirmed cases reached 7382, with 51 deaths. The Korean government, based on the church member registry of 244 743 believers it acquired from the Shincheonji authorities, analyzed connections among the church members and found 4212 confirmed COVID-19 cases by March 2, 2020. According to the analysis, 93% of the confirmed cases were related to the Shincheonji Church [5]. The possibility of massive infections at church services was suggested. As the number of COVID-19 cases exceeded 7000, the cases became more diverse.

Nonetheless, most COVID-19 cases were related to massive infections that occurred at churches, hospitals, sanitariums, private educational institutions, and dance studios, where many people gather in a closed and crowded environment and tend to come into physical contact with each other at a close distance (Figure 1) [6]. The Chinese National Hygiene and Health Committee acknowledged the possibility of infection through aerosols in the sixth edition of its COVID-19 Treatment Guide, provided "long-time exposures to dense aerosol in relatively closed environment" [7]. This means that spread through aerosols can manifest in two ways: one being droplet transmission by direct contact and the other being airborne spread. Generally, droplet transmission occurs when an infected person sneezes, coughs, talks, or exhales; this is known as primary aerosolization. In contrast, airborne spread occurs due to the spread of droplet nuclei with the size of less than 5 μm, left behind when the water in droplets evaporates. As these droplet nuclei are light and can float in the air for a long time, they can be especially dangerous [8]. Although religious services conducted in crowded spaces like churches and temples are vulnerable to infections, no specific prevention guides have been issued by the government. Most churches continued to host services as usual, despite the possibility of regional infection, as more and more cases of COVID-19 cases were confirmed. Contacts between hundreds and thousands of church members in the same space were inevitable, making people vulnerable to COVID-19 with its high infectivity. Furthermore, the KCDC suggested the possibility of limited but constant spread in groups through holiday services and small meetings [9].

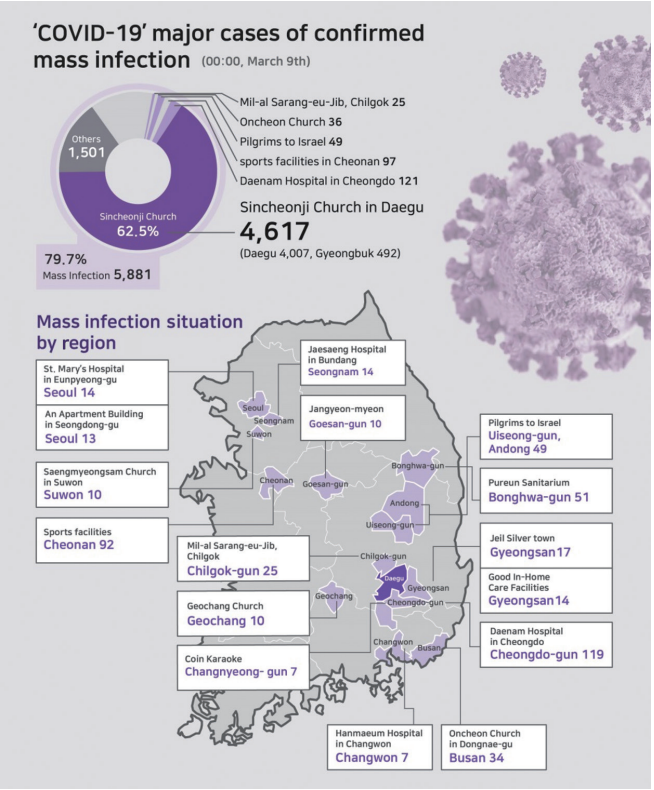

Figure 1. Coronavirus disease 2019 (COVID-19) major cases of confirmed mass infections. Modified from Korea Centers for Disease Control and Prevention. Coronavirus infection-19 (February 18) [6].

Private educational institutions and physical training facilities pose similar dangers. Even though the government postponed the start of the semester at kindergartens, elementary schools, middle schools, high schools, and universities for fear of massive infections, many private educational institutions and physical training centers are insisting on continuing their operations, thereby threatening COVID-19 prevention. According to a report issued on March 6, 2020, by the provincial government of Gyeonggi Province and the Gyeonggi Office of Education, only 9932 of 33 091 private educational and training facilities were closed on March 4, 2020, with a closure rate of just 30%. Due to their non-compliance with the government's strong measures of postponing the official start of the semester, the threat of COVID-19 infection and spread is increasing

dramatically. The Offices of Education cannot force private institutions to cease operations, as there is no legal basis for doing so. Voluntary cooperation is desperately needed [10].

The temporary conclusion of this study based on limited epidemiological data and the currently available information on confirmed cases is that group meetings and religious services lead to massive infections of COVID-19. When a new infectious disease is spreading, the government should sharply curtail group gatherings and religious events.

Voluntary reduction of external activities by individuals is the most proactive way to prevent the spread of large-scale infections. This study is meaningful in that it emphasizes the precautionary principle in preventing and managing infectious diseases, and it makes an urgently needed suggestion for public health policy.

Ethics Statement

This paper is a perspective, so it did not need ethical approval.

CONFLICT OF INTEREST

The author has no conflicts of interest associated with the material presented in this paper.

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AUTHOR CONTRIBUTIONS

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REFERENCES

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395(10223):497-506.
2. Korea Centers for Disease Control and Prevention. Coronavirus infection-19; 2020 Feb 12 [cited 2020 Mar 9]. Available from: http://ncov.mohw.go. kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352840&contSeq=352840&board_id=140& gubun=BDJ (Korean).
3. Yoo JH, Hong ST. The outbreak cases with the novel coronavirus suggest upgraded quarantine and isolation in Korea. J Korean Med Sci 2020;35(5):e62.
4. Korea Centers for Disease Control and Prevention. Coronavirus infection-19; 2020 Feb 4 [cited 2020 Mar 9]. Available from: http://ncov.mohw.go.kr/baroView.do?brdId=4&brdGubun=&dataGubun=&ncvContSeq=&contSeq=&board_id= (Korean).
5. Lee DH. The government "93% of confirmed people are infected with Sinchonji" president Moon "pracial ctions". Hankookllbo; 2020 Mar 6 [cited 2020 Mar 9]. Available from: https://www.hankookilbo.com/News/Read/202003031736056042?did=NA&dtype=&dtypecode=&prnewsid= (Korean).
6. Korea Centers for Disease Control and Prevention. Coronavirus infection-19 (February 18); 2020 Feb 18 [cited 2020 Mar 9]. Available from: http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=352968&contSeq=352968&board_id=140&gubun=BDJ (Korean).
7. Jung YH. Chinese authorities add corona 19 disturbance path "aerosol formation". KBS News; 2020 Mar 4 [cited 2020 Mar 9]. Available from: http://news.kbs.co.kr/news/view.do?ncd=4393978&ref=A (Korean).
8. La Rosa G, Fratini M, Della Libera S, Iaconelli M, Muscillo M. Viral infections acquired indoors through airborne, droplet or contact transmission. Ann Ist Super Sanita 2013;49(2):124-132.
9. Korea Centers for Disease Control and Prevention. Coronavirus infection-19 domestic outbreaks (February 22); 2020 Feb 24 [cited 2020 Mar 9]. Available from: http://ncov.mohw.go.kr/tcmBoardView.do?brdId=&brdGubun=&dataGubun=&ncvContSeq=353050&contSeq=353050&board_id=140&gubun=BDJ (Korean).
10. Byun YC. Postponement of school opening, 'combination', and teaching instructors… Outbreak 'emergency'. Nocut News; 2020 Mar 6 [cited 2020 Mar 9]. Available from: https://www.nocutnews.co.kr/news/5303397 (Korean).