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
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].

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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