

A study on the school's infectious disease crisis management system

-Focusing on the policy-making process and legal and institutional supplementary measures in the COVID-19 situation.

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A B S T R A C T

The purpose of this study is to derive policy tasks for establishing a system that can operate schools more stably in the future of infectious disease crisis. Infectious diseases have had the greatest impact on education throughout modern history, and it is very important for schools to have an infectious disease crisis management system. This study compares and analyzes the school's response to infectious diseases in the Middle East Respiratory Syndrome (MERS) crisis in 2015 and ongoing COVID-19 from 2020 to present, and suggests future tasks. In particular, it evaluates the improvements focusing on the crisis management core system that has changed in response to the two infectious diseases, and points out areas that still need to be supplemented. Regarding the problems identified through comparative analysis, this study suggests ways to improve the system in the future through interviews with leaders including the Minister of Education.

Key words: MERS; COVID-19; school crisis management; coresystem; leadership.

1. Introduction

1.1. Background and purpose of the study

The COVID-19 outbreak has had the greatest impact on safety management in school history. In the 70-year history of education in Republic of Korea, it was an unprecedented situation in which schools that were not closed even during the war were closed nationwide for more than a month (Yoo, 2020). After delaying the start of semester for about a month in the spring of 2020, schools have responded to the infectious disease crisis through online classes and density adjustment for two years after opening online classes in April 2020 and starting offline school attendance in May 2020 (Ministry of Education, 2021; Ministry of Education, 2022). School safety management is evaluated to have been relatively well conducted, with only a few cases of mass infection from schools before Omicron (Kim, 2021). In particular, compared to the time of the MERS crisis in 2015, when confusion was aggravated by the delayed response of the education authorities and the unreasonable suspension of school attendance by school principals, the response to COVID-19 in the education sector is

based on consistent systems and guidelines from the central government to school sites.

However, it was pointed out that the quality of 'education', the essence of the school, has been significantly damaged, including the learning gap by level and region. Eun Young Cho, Young June Choe (2021:62) emphasized that the benefits of school closures are limited and that it can have negative consequences for the future health of children and adolescents. Considering the 4 stages of crisis management (Lee, 2018:239-242), safety management through school closure is effective in the preventing and preparing progress against the spread of infectious diseases, but considering the recovery stage, the best way for quarantine and education at the same time should be found.

This study aims to analyze what has improved and what is still lacking through comparison of response activities in the education sector during the MERS and COVID-19 crisis. In addition, future tasks were derived through in-depth interviews with leaders, including the Minister of Education, who had implemented the school safety policy since the first response to COVID-19 in January 2020.

In the absence of a specific legal system or guidelines for the education authorities and school principals to follow in the event of an outbreak of an

infectious disease, this study is expected to help prepare countermeasures.

1.2. Research scopes and methods

The 'Elementary and Secondary Education Act', defined schools as elementary schools, middle schools, high schools, special schools, and miscellaneous schools. In the 'Pre-Primary Education Act', kindergartens are also defined as a school. This study targets the activities and related policies of schools under the Elementary and Secondary Education Act, which are generally recognized as schools.

While universities have autonomy from budget to operation within the scope of the 'Higher Education Act', elementary and secondary schools are operated according to consistent guidelines and notices from education authorities such as the Ministry of Education and the Metropolitan-Provincial Offices of Education. Therefore, the school crisis management system plays an important role in responding to infectious diseases.

Despite the uniqueness of schools in responding to infectious diseases, there is no system including a specific legal system for schools to respond to infectious diseases.

The 'Infectious Disease Prevention and Management Act' does not classify and respond to schools. The 'School Health Act' does not stipulate school policies and activities related to the prevention and management of infectious diseases.

For this reason, leaders' decisions are very important in responding to school infectious diseases and managing safety. In this study, in-depth interviews are conducted with leaders who devised and implemented school quarantine policies. In the situation that had no legal system for responding to infectious diseases, this study analyzes what activities were done to make important decisions such as closures or online classes, and what influenced those policies.

This study will analyze announcements and press releases of education authorities from consultations between the Ministry of Education and the Metropolitan-Provincial Offices of Education to the announcement of 'Post-Omicron Daily Recovery Promotion Plan' in April 2022. This will be compared with the decision-making process at the time of MERS.

It will also use in-depth interviews with the deputy prime minister and minister of education, a representative teacher who served as the chairman of the Smart Education Association as well as an interview with a grade 4 senior supervisor who served as a link between the education authorities and the school site for 27 months. It will refer to the guidelines and basic plans of the Ministry of Education

related to elementary and secondary schools to respond to COVID-19.

2. A Theoretical Discussion on the Crisis Management of Infectious Diseases in Schools

2.1. Analysis of legal system related to school health and safety

Article 8 of the 'School Health Act' stipulates 'suspension of school' due to infectious diseases. Paragraph 1 says that students or faculty members who have been infected with, suspected of being infected, or feared to be infected as a result of a health examination or a doctor's diagnosis can be suspended from school as prescribed by Presidential Decree.

Paragraph 2 states that the Minister of Education may order the school principal to suspend school attendance in consultation with the head of the Korea Centers for Disease Control and Prevention if a crisis alert is issued under the 'Framework Act on The Management Of Disasters And Safety' due to an infectious disease. It did not specify how the school should respond to the infectious disease situation other than the 'suspension of school'.

Another law related to school safety is the 'School Safety Accident Prevention and Compensation Act'. This Act is intended to compensate students, teachers, and participants in educational activities promptly and appropriately for damages caused by school safety accidents. Safety education activities are stipulated, but not how to cope with accidents or risks when they occur.

The 'Educational Environment Protection Act' was enacted to enable students to receive education in a healthy and comfortable environment. Paragraph 2 of the Act stipulates that the school and all elements around the school are educational environments in order not to interfere with the health, hygiene, safety, and learning of students.

Nevertheless, it does not provide a basis for school operation and quarantine support in the case of an infectious disease, only focusing on matters related to the construction or installation of facilities that develop around the school site or school area.

Accordingly, systematizing how to manage school safety in an infectious disease situation is a very necessary study for future infectious disease response.

2.2. Characteristics of school health and safety management

Due to the peculiarities of densely populated school sites in Korea, it was found that students are

more vulnerable to infection than adults. How schools respond to infectious disease situations can affect community transmission (Jang, 2015:8).

The powers and responsibilities of educational authorities and schools are divided according to policies that directly affect school safety management. The Ministry of Education establishes and supports policies for educational activities based on the law. The 17 Metropolitan-Provincial Offices of Education coordinate and apply related policies to the respective city or province.

The national policy and regional autonomy policy work together. In accordance with the infection situation in the density-adjusted area, only one-third of students in the metropolitan area can go to school while all students can do in Jeollanam-do (Lee, 2021).

Also, according to the 'Elementary and Secondary Education Act', the principal has the authority to decide suspension of school. However, the principal follows the policy decisions of the Ministry of Education and the Metropolitan-Provincial Offices of Education. When a nationwide infectious disease occurs, the educational authorities' guidelines on educational activities sometimes exert power beyond the law (Ministry of Education, 2022).

2.3.Literature Review

Jang (2015:8) emphasized the importance of responding to school infectious diseases through a study on measures to strengthen school infectious disease management. He also highlighted the current state of the school's response to infectious diseases in the event of an outbreak. He pointed out that the source of infection can flow into the school as students travel between school-home-community, and conversely, the source of infection can spread from school to home and community.

Choi (2020:20-25) analyzed how safety management has changed due to new infectious diseases that have occurred over the past 10 years, ranging from severe acute respiratory syndrome (SARS), MERS, and COVID-19. At the time of MERS, information on hospitals where the infectious disease occurred was not transparently disclosed. It was evaluated that the policy about the information disclosure played a role in preventing further infection during COVID-19.

Jang (2017) studied the priorities of school infection prevention activities through 'A Study on the National Crisis Management System in the Case of the New Infection Diseases: Focusing on School Infection Prevention Activities'. The researcher said that because schools and academies have vulnerable environments to infectious diseases, priority decision is needed for health and education authorities

to take preventive measures tailored to their characteristics. In the early stages of the outbreak of infectious diseases, identification of students with infectious diseases and maintenance of the reporting system were ranked as the highest priority. In the area of strengthening capacity for crisis response, transparent disclosure of information was found to be high, and in the area of measures for returning to daily life, the preparation of quarantine standards to resume normal classes was found to be high. It was also emphasized that it was necessary to make it mandatory to establish a comprehensive plan for infectious diseases focused on the field (Jang, 2021:79-82).

Yun (2022:128-135) investigated in which fields schools, students, and teachers experienced crises, and analyzed how school crisis management competency changes according to experiences and perceptions. She divided the common competency for each stage of crisis management and the required competency for each area and diagnosed the COVID-19 situation. As the whole nation recognized the importance of quarantine, the current level of competency was higher than the required competency, however, the researcher pointed out that it seems that emotional and cognitive problems should be managed intensively.

Jung (2019; 2020) conducted a study on ways to improve the national crisis management system through the core system for the MERS and the COVID-19 disaster, respectively. The theory of 'the core system of the crisis and emergency management' came out for the first time by Lee (2015), who pointed out that the reason the national crisis management system did not work properly in a crisis situation was due to the absence of the core system through the Sewol disaster management analysis. The core system consists of five elements: value, institution, leadership, devotion, and expertise. Jung (2019; 2020) proposed methods to improve the national crisis management system through each of the five elements of the core system in two infectious disease situations.

Jo and Lee (2021) paid attention to how the five elements of the crisis management core system can be strengthened. It is noteworthy in that it suggests a way to strengthen the resilience of the community. Communication, active participation, and cooperation were emphasized.

In the case of the MERS disaster, the first measure that spread on a large scale was 'school closure'. School closure is one of the non-pharmacological infection control methods to prevent the spread of infectious diseases in schools (Cauchemez, et al., 2009).

However, it is also the most burdensome way to recover. Therefore Cho and Choi (2021) believe that school closures have negative consequences in the long run.

Although there have been many studies on infectious disease crisis management, the research on COVID-19 in various areas is still insufficient as it is still in progress in June of 2022. In particular, there are not many studies on the crisis management system and competency centering on schools.

Previous studies have shown that school crisis management is very important in the context of an infectious disease, and the necessity of school crisis management measures at each stage has also reviewed.

Crisis and emergency management policies are generally implemented in the stages of prevention-preparation-response-recovery (Lee, 2018). Crisis management measures should be prepared, from prevention to stop the spread of infectious diseases, to recovery for education with preparations that schools can urgently respond to when a confirmed case occurs.

3. Comparative analysis of the school's infectious disease response activities at the time of MERS and COVID-19

3.1. School response to MERS outbreak

On May 20, 2015, the first MERS patient in Korea came out, and on June 2 of that year, an elementary school in Gyeonggi-do, where another MERS patient died, was closed for the first time (Lee, 2015).

The school closure was spread in just one day. On June 3, the Central MERS Management Headquarters of the Ministry of Health and Welfare announced the opinion that school closures were inappropriate, but schools across the country were closed afterwards. As of June 3, there were 544 schools nationwide (Kim, 2015), and the number of closed schools increased to 2,704 schools nationwide (Park, 2015) on June 10, if the universities were included.

Finally, a joint investigation team of the Korean government and World Health Organization (WHO) recommended that schools that are closed should 'strongly consider' the resumption of classes as schools are not related to the spread of MERS (Yang, 2015), but the principal still chose to close.

Kim, Ji-hak (2015:4-8) pointed out that the Metropolitan-Provincial Offices of Education responded late at the time, causing unnecessary closure of schools and adding to the burden on schools in response. At that time, the contents of the official letter sent by the metropolitan and provincial offices of education were not accurate, and they did not provide contents for the education while they ordered instructions to educate students for prevention.

The contents of the official letter put all responsibility on the health teacher, which was highly op-

posed by the health teachers. The Gyeonggi Provincial Office of Education, which was studied by Kim Ji-hak (2015:11), formed an on-site-oriented MERS countermeasure organization on June 23, more than a month after May 20, when the first infected person in Korea came out. It was also pointed out that while developed countries focused on communication and information sharing, Korea only focused on blocking spread the virus.

Education authorities also issued guidelines same as guidelines from the government and quarantine authorities, emphasizing only fever monitoring, daily reporting, and vaccination. In the health forum centered on private experts, they created a bulletin board to respond to local issues and shared information, but the Provincial Office of Education did not even respond like that.

During the H1N1 flu, WHO (2015) suggested the appropriate measures for monitoring and blocking the diseases such as establishing a participatory decision-making council in which all stakeholders participate and establishing a business continuation plan. It was difficult to find examples of applying this in an educational environment.

On the other hand, Kim (2015) pointed out that the United States and the United Kingdom established a cooperative system with health authorities and provided specific guidelines so that each school could respond according to the situation. Although students, parents, and teachers in those countries were able to communicate through the system, there was no communication system based on trust in Korea. It brought the spread of fake news.

Lee, et al. (2015) analyzed that not only schools did not respond properly, but also caused confusion in the absence of a control tower, during the MERS outbreak.

The fever monitoring caused complaints because it was not accurate. Some students measured the temperature after taking medicine in order to avoid being branded to MERS patients. And some didn't want to take disadvantages from suspension of school according to the fever. As the school was closed, an ironic situation also occurred that students were flocked to private academies and internet cafes (PC rooms).

It was diagnosed that the shutdown was also decided by parents' complaints because it was left to the discretion of the school, not based on expert judgment.

3.2. School response to COVID-19 outbreak

The first confirmed case of COVID-19 in Korea was in January 2020, when most schools were on vacation. According to the Ministry of Education's white paper '2020 Education Response to COVID-19(2021)', the ministry at the time focused on

measures related to the inflow of Chinese international students into Korea and established the 'COVID-19 Education Countermeasures Headquarters' on February 21st.

On February 23, the opening semester of pre-elementary, elementary, middle, and high schools was postponed for the first time from March 2 to March 9. The education authorities started reviewing online learning contents in preparation for the delay in starting school. On March 2, the Ministry of Education announced the second postponement of school opening from March 9 to March 23. On March 17, school starts are postponed for the third time to April 6.

Even at that point, anxiety over the spread of COVID-19 increased, and eventually, it was decided to carry out the 'online opening' for the first time in history, which was nationwide.

The Ministry of Education and 17 Metropolitan·Provincial Offices of Education had expanded the capacity of Public Learning Management System (LMS) for enormous simultaneous access so that all schools were able to operate online classes smoothly and reorganized the system to provide advanced services such as real-time video classes in the second semester. Laptops and tablet PCs were provided to low-income students without smart devices, creating an environment where all students could learn online.

Since it was the first time in the world to open schools online nationwide, a lot of countries asked the help to the companies that participated in the preparations for the online school opening at the time (Lee and Choi, 2020).

Although it was meaningful to maintain education, the online school raised the problem of creating a learning gap depending on the preparation of teachers, and that the school could not perform its role properly as opportunities for peer groups to mingle decreased. The Ministry of Education, deciding that online classes could not be a complete substitute for schools, formed a consultative body with the Metropolitan·Provincial Offices of Education to prepare for returning to school. On May 4, the authorities announced plans to return to school, and detailed quarantine guidelines were also announced on the 7th.

The students were asked to do a self-medical examination every day and report it to the school. From May to early June, school attendance was carried out in stages by grade level, but as the infectious disease situation worsened, measures to minimize the density were implemented. Since then, the level of school attendance has been adjusted by the density of schools in conjunction with the quarantine authorities' reinforcement of social distancing. Depending on the school, students were allowed to

attend school by turn for each grade level, or to attend classes in morning and afternoon classes.

Students who could not attend school due to density adjustment took online classes. In the metropolitan area, when school attendance was limited to once or twice a week, concerns about learning deficit grew. Many of students and Parents continued to complain that teachers didn't manage the class properly just playing videos and some of them compared with other schools and teachers (Kim, 2020).

Accordingly, the Ministry of Education had prepared guidelines for school operation that make interactive online classes a priority from the second semester.

The Ministry of Education had held 330 countermeasures meetings from early 2020 to May 2022 (Ministry of Education, 2022:3), and had acted as a control tower to respond to COVID-19. It is different from MERS that the school had to decide on its own and respond at its discretion in the absence of a control tower.

The policy for online classes also was reviewed at the time of MERS but could not be conducted due to lack of system. The online classes were able to be conducted by improved systems and technologies. It is also an improvement from MERS in COVID-19.

However, as the Ministry of Education and the Metropolitan·Provincial Offices of Education acted as a control tower and responded with uniform guidelines, problems that did not fit with reality appeared one after another.

Lee (2022) listed the issues that have been strongly opposed by the school field and parents. He criticized that the government should treat them as a lesson in the COVID-19 response white paper, but it didn't. Students and parents protested the government's policy to apply the quarantine pass to private academies, and even filed a lawsuit. The Ministry of Education withdrew the policy due to such opposition. There were also problems, including the confusion of online classes caused by the frequent malfunction of the online learning program. As the education authorities issued a 'uniform education guideline' for schools to use the same system, the problem of simultaneous access occurred.

According to Lee Han Joo (2022), daily life has completely changed due to the COVID-19 pandemic, and schools and students have also undergone many changes. At the school site, teachers and students were confused by the sudden difficulty in sourcing equipment for remote learning, inexperience in how to use it, and lack of educational contents. In some cases, problems such as reduced concentration and increased fatigue about online learning occurred. The researcher pointed out that while students have spent more time at home, the bond between family members has been strengthened,

but on the contrary, other problems such as domestic violence and child abuse have arisen within the home.

3.3. What do MERS and the COVID-19 response problem have in common?

A lot of research has been conducted on how to manage the crisis of infectious diseases in schools during the MERS chaos. Shin, et al. (2010) pointed out the problems about the response system of the Office of Education through investigating the problems in response to the influenza H1N1. As a measure for improvement, they argued that public health teachers who were familiar with both infectious diseases and school sites should be included in the educational administrative organization.

The importance of prior education for the prevention of infectious diseases has been emphasized several times. There is also a study by Kam, et al. (2013) that showed that people who received prior education or training got higher score in response to infectious diseases than who did not.

However, the government guidelines for infectious diseases focus on post-management measures, and the contents of preventive education and management are not standardized (Kim, et al., 2012:78).

After the MERS outbreak, Jang (2017) pointed out that health and education authorities should establish preventive measures tailored to the characteristics of each institution and emphasized on the need to make it mandatory to establish a field-oriented comprehensive plan for infectious diseases. However, even after experiencing COVID-19, the school's comprehensive plan for infectious diseases has never been established.

Jeong, et al. (2021) analyzed 7,189 articles and 44,935 blogs posted on Naver (the internet portal site) from January 2020 to July 2021 to sort out education-related issues during the COVID-19 period.

△The fundamental problems in the disaster situation △the aftermath of school suspension △the school as a quarantine space △individual efforts to fill the gap in education and care △private education and private institutions replacing the school role were raised as issues during COVID-19. These are problems that were experienced during the MERS era as well.

Byun, et al. (2018:492) argued that it had been necessary to secure the professional expertise to manage the crisis of infectious diseases for effective decision-making during the MERS outbreak, but in an interview to be described later, the lack of quarantine manpower was also pointed out to be a big problem in COVID-19. This study also diagnosed the education field in line with the core system comparison of Jung (2019, 2020). Responses to MERS and COVID-19 are also different in the core system.

In the value area, there was insufficient consideration of education suspension while focusing only on preventing the spread of MERS. In accordance with the principle that education should be maintained during the COVID-19 period, online opening, gradual school attendance, and density adjustment were made. The legal system was not much different, but there was a difference in terms of infrastructure. With the development of information technology (IT) and networks in COVID-19, it was possible to promote nationwide remote classes. In MERS, it was only reviewed.

Although there were guidelines in a broad framework, the leadership of principals was emphasized in both MERS and COVID-19. Unlike in everyday life, it was necessary to establish a cooperative system to ensure the safety of students and to have professional knowledge and ability for non-face-to-face classes. Leadership was also needed to ensure that the curriculum was flexibly operated in situations of density adjustment or school suspension, and to guide students exposed to games or domestic violence during distance learning (Yang and Park, 2021).

The biggest difference is governance. During the MERS outbreak, the Ministry of Education or the Offices of Education did not make guidelines related to the closure and left it to the principal to decide. Even when the Ministry of Health and Welfare recommended refraining from closing, it was not reflected. There was no control tower for the school's infectious disease management even though the education authorities and the health authorities should have cooperated. It can also be viewed as a lack of leadership.

<Table.1 Comparison of the Response >

	MERS	COVID-19
Quarantine expertise	-Cannot attend the process for policy decision -Absolute number is insufficient	-Attend the process for policy decision -Too burden to health teacher because of prolonged
Prevention Education	Schools didn't have contents	Not enough contents
Core system	-Value : Priority to prevention of proliferation rather than education. -Leadership: No governance. -Infrastructure: No system or	-Value: prevention of diffusion, maintenance of education. -Leadership: Education authorities lead the

	content for nationwide online classes	way to prepare guidelines. -Infrastructure: A system and network that made remote classes possible nationwide.
School Closures	Principal's discretion.	Consultations with relative organization.
Legal system for Comprehensive plan	No	No

4. Suggestions for improvement of the school's infectious disease crisis management system through in-depth interviews

4.1. Yoo, Eun Hye, Deputy Prime Minister and Minister of Education

Deputy Prime Minister and Minister of Education Yoo Eun-hye had served from October 2, 2018, to May 9, 2022, and had led the overall response to COVID-19 in the education sector as the head of the education authority throughout the COVID-19 response period. The interviews were conducted twice on April 5 and May 9, 2022, and additional written interview for the confirmation during the tenure of Deputy Prime Minister. The author would like to present the areas where the response to COVID-19 was successful and what needs to be prepared to respond to infectious diseases in the future through in-depth interviews.

During the interview, the point that Deputy Prime Minister Yoo emphasized the most in responding to infectious diseases was the cooperative system. She said that schools and authorities were able to overcome a difficult hurdle because they had responded through consultation with the Metropolitan-Provincial Offices of Education and consultation with the Centers for Disease Control and Prevention (KCDC).

Deputy Prime Minister Yoo went through consultations with the Superintendent of Offices of Education every time she decided. Regarding this, she said, "The Ministry of Education and the Metropolitan-Provincial Offices of Education have continued to communicate and cooperate based on mutual respect. I think we were able to guarantee the students' right to study and the right for health." It is said that the plan was prepared in response to COVID-19 by

closely sharing information on the changing policies of the quarantine authorities, the conditions and circumstances of regions and schools, and the opinions of school members through various consultative bodies.

Despite regional differences in the early stage of COVID-19, the superintendents gave their advice and cooperation to ensure a stable school policy by prioritizing the whole country over the local situation. She expressed gratitude to the Superintendents of the Offices of Education for their efforts to recover daily life for education.

"Given the experience of responding to COVID-19 for two years and four months, one of the most important things in responding to infectious diseases was to understand the characteristics of the infectious disease virus and to respond closely with quarantine authorities", Deputy Prime Minister Yoo said.

For this reason, meetings and consultations with the KCDC have been held from time to time since the outbreak of infectious diseases, and education authority was able to wisely overcome many difficulties by reflecting the professional opinions of the quarantine authorities.

Deputy Prime Minister Yoo also diagnosed that it is necessary to revise and distribute manuals for future responses. The Ministry of Education began responding to COVID-19 in earnest on February 2, 2020, starting with the 'Guidance Measures for Emergency Measures for Universities Related to COVID-19'. On the 21st of the same month, the Ministry of Education established 'COVID-19 Countermeasures Headquarters' and responses related to pre-elementary, elementary, and secondary education were also started. According to an analysis of the press release posted on the Ministry of Education's website from January 2020 to June 2022, 29 new and revised academic management plans, guidelines, and quarantine-related guidelines for elementary/secondary education were issued. The authority distributed revised guidelines every semester. Deputy Prime Minister Yoo said, "I think it is necessary to make up for deficiencies by preparing comprehensive measures for infectious diseases in school facilities, and to effectively respond to a resurgence of infectious diseases or similar infectious diseases by supplementing the current response manual."

She continued, "In the future, I think it will be the most important to prepare a channel for smooth communication with the quarantine authorities in case of a similar situation and respond to it. Based on the response cases so far, it will be necessary to revise and disseminate the relevant manual so that school sites can respond more actively."

In the same way, she reiterated that the policy was carried out based on the continuous collection of opinions from students and parents, school sites,

and the related private sector. “In particular, through the Ministerial Meeting on Social Relations, we actively discovered tasks for collaboration with related ministries and the private sector,” she emphasized.

Deputy Prime Minister Yoo said, “I think that such efforts for collaboration and communication are the driving force that activates communication and leads to cooperation with all walks of life, including the private sector, when difficulties arise in the policy implementation process.”

4.2. Cho, Ki-seong, Chairman of the Smart Education Association

Cho Ki-seong, chairman of the Smart Education Association (teacher at Gyeseong Elementary School, Seoul) pointed out that the most striking difference between the MERS response and the COVID-19 response was the control tower and online classes in several face-to-face and phone interviews.

The possibility of conducting nationwide online classes was possible due to the financial input from the authorities and organizational preparation. However, there was a lot of confusion on the school site. As a leader in smart education, he played a role in raising the level of online teaching skills nationwide.

The chairman, Cho, emphasized that online class will not only play an important role in the future of infectious diseases, but also enable what the current education system cannot do. He suggested that a digital voucher system is necessary to reduce the confusion experienced by COVID-19. The voucher system is what allows teachers to freely purchase digital contents or edu-tech within their budget. Currently, schools and offices of education not by each teacher are allowed to purchase necessary contents, and their autonomy is extremely limited.

He explained that there were cases that teachers had to purchase with their own money if there was a fee for a foreign application that could collect students’ opinions during online classes. In the early days of COVID-19, a lot of teachers purchased educational materials, including webcams, with their own money. The system has been improved and principals and teachers can purchase them in broader range, there were still many limitations.

4.3. Lee, OO, Grade 4 Senior Supervisor of the Metropolitan-Provincial Offices of Education.

The Grade 4 Senior Supervisor Lee, who requested anonymity, currently belongs to the Office of Education, and had played a role in collecting the opinions of principals from the Small and Medium

City Support Office throughout the COVID-19 response. This study hides his given name. Two phone interviews were held with him on May 31st and on June 3rd.

He said, “principals often suffered from confusion due to the changing guidelines although it is necessary for the education authorities to set guidelines.”

He explained that as the response to COVID-19 has changed from focusing on quarantine towards normalizing schools recently, there were difficulties in conducting online and face-to-face classes at the same time.

Some parents insisted they needed to go to school, while others asked for online class depending on their own circumstances, which caused confusion. Moreover, there were some cases that the media first reported the guidelines before the Ministry of Education accurately delivered the guidelines. Principals had to spend more time responding to complaints from parents rather than preparing to respond to the guidelines. Lee suggested “If there is a standard set in a larger frame rather than setting guidelines every time, I think the curriculum will be smooth.”

In terms of the curriculum, there is no consideration of the infectious disease situation, he said, and he expects it to be reflected in the curriculum to be revised this year. Only then can the academic management guidelines become clearer. He pointed out that since the existing curriculum presupposes face-to-face classes, there are many problems with online classes such as the approval of regular course. He explained that the guidelines related to the school operation plan were gradually supplemented in detail during the COVID-19 response process and emphasized the need for teacher training accordingly. The supervisor said “Teacher training will have to be the part of strengthening the capabilities of online classes, if it is too detailed, it can lead to confusion in different schools. There was a big deviation and a difference in satisfaction as there was nothing related to remote classes.”

Regarding the unification guidelines, he said, “We need an opportunity to reflect local opinions.” He pointed out that the biggest difficulty he had in the field was securing quarantine personnel. He said, “It takes time to get the budget and use it, so the Offices asked schools to spend the school operation fee first and to take supplement later.” adding, “It will be difficult for the Offices of Education to secure the quarantine budget at all times, but we have to come up with a plan.” Securing quarantine personnel is also a part of the need for legal basis to invest the budget

5. Limitations

This study drew problems and directions for improvement in a broad framework through a comparison of the MERS and COVID-19 response process and an in-depth interview with leaders. In the case of an infectious disease, a cooperative system with quarantine authorities, school sites, and stakeholders is necessary. It suggested to introduce a voucher system that teachers can actively utilize alternative technologies.

While the COVID-19 outbreak is still ongoing, there are no research results on how the COVID-19 specifically affected the education sector. In other words, because we do not know the exact circumstances of the damage, we could not specifically suggest which policies and systems are needed for the recovery of education. In the short to medium term, it can be said that this study was only conducted on the areas where schools and education authorities had difficulties in keeping up with the academic calendar and responding to the outbreak of infectious diseases.

In this regard, the Ministry of Education and the Office of Education have started a longitudinal study (Mun, 2022). It can be said to be a study on what problems elementary school students who have suffered from COVID-19 will face when they enter middle school, high school, college students, and society in the future. If such long-term research results are drawn, it is expected that in the long term, research on policies necessary for infectious disease crisis management will be conducted.

6. Conclusions

It can be said that the school's infectious disease crisis management capacity has been strengthened through the response to MERS and COVID-19. Even in the absence of a legal system, many things have changed through the operation of the control tower, such as making systematic closure decisions based on the judgment of quarantine experts and implementing remote classes to reduce learning deficits. The response at the time of MERS was mainly fragmentary and individual, but it developed into a preemptive and systematic response.

However, to preemptively respond to infectious diseases, budget and organization are required, and there must be a legal basis for this. It is hoped that this study will further improve the school's infectious disease crisis management capabilities by improving laws and systems in the future.

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Profile

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