


A Grounded Theory on School Nursing Experiences With Major Pandemic Diseases

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Abstract

This study was conducted to develop a substantive theory on school nurses' experiences responding to infectious diseases by applying the grounded theory method to explore their experiences and derive related concepts. Study participants were 20 school nurses with experiences coping with infectious diseases while working in schools. The research question of this study was "What kind of experience did the school nurses have in response to infectious diseases?" The analysis included open, axis, and selective coding. We derived 164 concepts, 45 subcategories, and 17 categories. Further, paradigm, situation, and school infectious disease response control tower models were derived. The results of this study can serve as bottom-up policy data to understand the current situation surrounding school infectious disease management through the experiences of school nurses.

Keywords

school, nursing, communicable diseases, grounded theory, COVID-19

What do we already know about this topic?

Schools are an environment prone to group infection because there are many students. School nurses manage the health of students and infectious diseases.

How does your research contribute to the field?

It contributes to the establishment of a system that helps the entire school respond to infectious diseases. Due to the outbreak of the pandemic, the role of school nurse as a control tower for responding to infectious diseases has increased. It is necessary to strengthen the capacity of school nurses to respond to infectious diseases and prepare an administrative and policy system.

What are your research's implications towards theory, practice, or policy?

This study can be used as bottom-up policy data to understand the current situation of school infectious disease management through the voice of school nurses. Further, it can be used to prepare for problems and develop improvement measures in the response system for infectious diseases in schools.

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Introduction

With the advent of the globalization, development of transportation and communication, and freedom of movement between countries and continents, the spread and inflow of infectious diseases are accelerating.

Accordingly, the incidence and spread of infectious diseases is increasing worldwide, which affects school health.¹ According to Korea Infectious Diseases portal statistics, the number of cases of infectious diseases among students aged 8–19 years has continued to increase from 34 470 in 2017 to 39,117 in 2019.² In addition, influenza, a common respiratory disease among children and adolescents, has been steadily increasing in incidence over the past 10 years.³ More than 70% of public health emergencies occur in schools and most are related to infectious diseases.⁴ In the past, infectious diseases were mainly caused by bacteria that reproduced due to problems with hygiene, nutrition, and poor environment; however, in the 20th century, viruses have become the cause of many new infectious diseases.⁵

In 2009, H1N1 influenza A occurred in 214 countries and killed 18,500 people.⁶ In Korea, 750,000 people were infected, and approximately 250 died.⁶ Although the Middle East Respiratory Syndrome (MERS) outbreak in 2015 was characterized as an infection in medical institutions, many schools were closed.⁷ Further, the coronavirus infection (COVID-19) has spread worldwide and is the third global pandemic after SARS and Influenza A.⁸

The first online school began in April 2020. Most teaching in Korea had been postponed to COVID-19 while elementary, middle, and high schools were closed. This led to many changes in the field of education and posed a threat to school safety.⁹ In the 2009 H1N1 Influenza A pandemic, the number of students infected rapidly increased; after the start of the second semester of school in 2009, student infections accounted for 39.1% of total infections.¹⁰ During the COVID-19 pandemic, there was massive transmission to 13% of all students and 16% of all staff within 2 weeks of 2 students with respiratory symptoms attending classes on campus.¹¹ Students operate in areas with a high population density and have close face-to-face contact; therefore, there is a high risk of easily transmitting infectious diseases if they are not properly managed.¹²

School nurses are responsible for preventing and managing the spread of infection in schools and must be at the forefront of responding to unpredictable epidemics resulting from infectious diseases. School nurses in Korea are qualified teachers and the only full-time health provider with teaching qualifications who can complete the teaching profession. They assess the overall health problems of the school, which are the basis of school

health, and take charge of health education and nursing room management. In addition, school nurses have infectious disease expertise and skills to manage communicable disease risk for students and staff. During a pandemic, the intensity of work related to infectious diseases increases, and daily work is halted. The resulting fatigue and stress also negatively affects the mental health of school nurses.¹³

Prior studies have assessed national crisis management to prevent school infectious diseases and policy priorities for responding to emerging infectious diseases. These have provided guidance on the reporting system for infectious diseases, early detection of patients, and establishment of field application plans.¹⁴ School infectious disease policies have been at the discretion of school nurses and principals, which can cause a lot of confusion.⁴ Moreover, major infectious diseases, such as chickenpox, influenza, and hand-foot-and-mouth disease, continue to increase in schools.³ It is necessary to approach infectious disease from an individual level or to improve organizational and practical response capabilities rather than using a theoretical response method.¹⁵ School nurses try to prevent the spread of infectious diseases through hand washing to prevent infectious diseases.¹⁶ Additionally, they increase the usefulness of infectious disease management through infectious disease prevention education.¹⁷ Few qualitative studies have analyzed the practical and psychological experiences of school nurses, who play the most practical roles in special situations, such as pandemic control.

In this study, we sought to analyze the experiences of school nurses working at the forefront of infectious diseases to discover problems in school infectious disease response policies and devise improvement plans. In addition, students' overall health is worsening due to the pandemic.¹⁸ This means that school nurses need a new approach for health promotion.¹⁹ Therefore, we intended to explore the accessibility of school nurses as a health promotion tool in the context of a school pandemic. In particular, this study used a grounded theory methodology, which is most suitable for generating, rather than discovering, theories about practical experience in responding to infectious diseases that have not been studied. This study is useful for revealing and interpreting the structural patterns in how school nurses respond to infectious disease outbreaks. Additionally, it can be used to prepare an infectious disease prevention system in schools through grounded theory analysis. It is meaningful to prepare school health infectious disease response policies by identifying the experiences of school nurses. This research will assist in the preparation of programs to strengthen the necessary infectious disease response capabilities for school nurses to prevent work burnout.

Methods

Research Design

This study is qualitative grounded theory, first proposed by Strauss and Corbin,²⁰ was applied to analyze the nature and meaning of school nurses' experiences in responding to infectious diseases and develop a substantive theory that explains their experiences.

Research Participants

The research participants were school nurses with experiences coping with infectious diseases while working in schools. The research participant selection method was performed for school nurses who were introduced by acquaintances using the snowball sampling method. First, we checked whether the introduced research participants had experience responding to infectious diseases. If they did, we briefly explained the research method and purpose of the study. Next, we provided detailed information via text messages and phone calls. Study participants were selected if they fully understood and agreed to participate. Sampling was performed at the same time as data collection and analysis. These processes were conducted until promising data were obtained. Samples were additionally extracted step by step until nothing new was revealed.

Data Collection

To collect data for this study, 1:1 in-depth interviews were conducted with participants. Interviews with the study participants were conducted from July to August 2020. Face-to-face interviews were conducted with fifteen out of twenty research participants. Five were interviewed remotely: by phone (2 people) and Zoom (3 people) to reduce contact with outsiders due to the COVID-19 pandemic. The researcher mainly conducted the face-to-face interviews at a comfortable place desired by the participant, which was typically a school nurse room. The selection of participants and research questions were reviewed by professors and qualitative research experts with experience in school nursing. The researcher conducted all interviews, and the interview content was recorded and transcribed by the researcher.

Interviews were between 60 and 90 minutes in length. The number of interviews per participant was 1–2; the second interview was performed to understand any content from the first interview more clearly. More credibility was secured by repeating questions at the second interview that required supplementary statements or clarity based on the contents of the first interview. The initial interview question was an open-ended question, starting with "What experience did you have in responding to infectious diseases as a school nurse?" As the interview progressed, the content was refined through the following sub-questions: "As a school

nurse, what is the most memorable incident while responding to infectious diseases?" "As a school nurse, what experiences did you have with students, faculty, and parents while responding to infectious diseases?" "As a school nurse responding to infectious diseases at other institutions, what experiences did you have with the health center, education office, local community, etc.?" "What was a rewarding experience as a school nurse responding to an infectious disease?" "What was a difficult or challenging experience as a school nurse responding to an infectious disease?" "As a school nurse, what do you think is the most important thing in responding to infectious diseases?"

Data Analysis

Data analysis was performed used open, axial, and selective coding, as suggested by Strauss and Corbin.²⁰ The contents of the in-depth interviews were recorded and transcribed. The final analysis was conducted by referring to the in-depth interview data, research journal, newspaper articles, official documents, and news based on the original data. The open coding stage consisted of naming phenomena, deriving concepts, and categorizing them through data analysis.²⁰ The axial coding stage connects categories and subcategories within the category as an axis, developing them into categories, and assessing the relationship between categories as a paradigm model.²⁰ The selective coding stage integrates and elaborates categories as well as developing the dimension of analysis into theory.²⁰ The final conceptual framework model was derived via causal, contextual, and mediating conditions, central phenomena, action/interaction conditions, and results. During this process, the researchers articulate their interests and any preconceived notions that influenced their findings.

The overall data analysis process of this study is summarized as follows. After the researcher read the interview transcripts, they individually categorized the contents and performed coding. Line-by-line analysis was used to cut and categorize each phrase and examine each word in detail to derive the concept. Next, the central phenomenon contained in sentences and paragraphs was identified, and similarities and differences were compared and coded in detail. Finally, the conceptual framework, which is the final theory of this study, was completed.

In constructing a concept in this study, the researchers checked the interview and analysis data with the research participants via email to confirm whether they accurately described their experiences. Additionally, they checked whether the concepts, categories and phenomena were well represented. The applicability of the study results were verified with 3 different school nurses who were not study participants. Two professors with experience in qualitative research reviewed the data and helped to avoid bias. The researchers recorded all the processes of data collection and analysis. This included notes or

Table 1. Participant Characteristics.

	Gender	Age (Years)	School	Type of establish	Work experience (Years)
1	Female	50	Elementary	Public	4
2	Female	44	High	Private	5
3	Female	29	Middle	Public	7
4	Female	40	High	Private	1
5	Female	45	High	Public	9
6	Female	37	Elementary	Public	12
7	Female	35	High	Public	8
8	Female	39	Elementary	Public	10
9	Female	54	Elementary	Public	26
10	Female	37	Middle	Public	8
11	Female	53	Elementary	Public	7
12	Female	54	Middle	Private	30
13	Female	37	Elementary	Public	2
14	Female	53	High	Private	15
15	Female	30	Middle	Public	3
16	Female	53	High	Private	5
17	Female	38	Elementary	Public	8
18	Female	35	High	Public	1
19	Female	42	Elementary	Public	15
20	Female	51	Elementary	Public	10

diaries on the collected data, such as field records and interviews. Therefore, anyone could check the data or review school nurses' experience without distorting the actual situation.

Ethical Approval

This study was approved by the institutional review board of the researchers' organization. The ethical approval code (IRB number) is 1041078-202003-HRSB-068-01. The research purposes and process were explained to all participants and they were informed that they could refuse or withdraw participation at any point, without detriment. Only participants who understood the study conditions and signed the study consent forms were allowed to participate in the study.

Result

Participant Characteristics

Participants in this study consisted of twenty school nurses who had experiences of responding to school infectious diseases and were willing to participate in the study [Table 1](#). Participants were all female, aged between 29 and 53 years. 9 worked in elementary school, 5 in middle school, and 6 in high school (fourteen public and 6 private). Working experience varied from 1–30 years.

Results of Open and Axis Coding

The analysis yielded 164 concepts, 45 subcategories, and 17 categories. ([Figure 1](#)) shows the result of the axis coding that

further developed the configuration. [Table 2](#) is the open and axis coding results.

A central phenomenon in the experience of school nurses responding to infectious diseases. The central phenomenon refers to a central thought or event that is specifically regulated or developed by an action/interaction strategy. It is the core psychological process that participants consider most important.²⁰ We found that the central phenomenon of school nurses' experiences of responding to infectious diseases was "Struggling with loneliness." School nurses reported experiencing loneliness while taking full responsibility for the outbreak of an infectious disease and trying to solve the epidemic situation. School nurses tried to do their job, even though they could not manage alone, with a sense of duty to protect the school from infectious diseases. In this process, the school nurses were struggling.

"It could be an obligatory responsibility, it could be pride, and now I have to do what I am assigned to do. I am smiling, but my heart is [saying] that I want to take a leave of absence. It felt more like being alone." (School Nurse 17)

"It was very difficult because there was a lot of pressure during the initial preparation period. It's okay once school starts and I start working, but I felt a lot of pressure until the kids arrived, and I hoped that time would pass." (School Nurse 2)

"I was so nervous about that... I was suddenly contacted and I was surprised by the news that I was the contact and it occurred so suddenly. It's like working on a thin sheet of ice." (School Nurse 13)

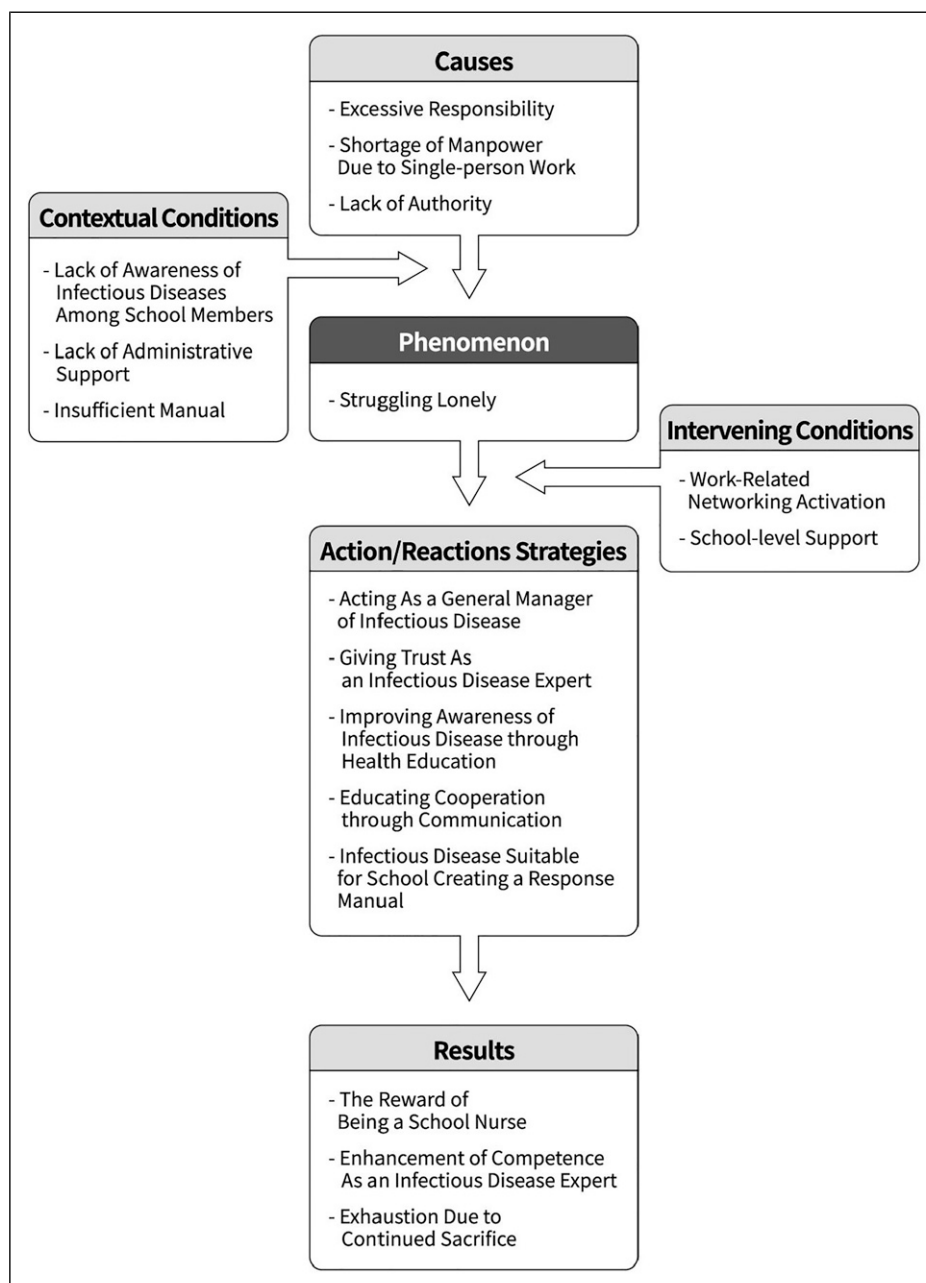


Figure 1. The process of responding to infectious diseases by school nurses.

Causal Conditions of School Nurses' Experiences of Responding to Infectious Diseases. A causal condition refers to a sequence of events that triggers or develops the emergence or development of a phenomenon.²⁰ The causal conditions of this study were “excessive responsibility,” “shortage of manpower due to single-person work,” and “lack of authority.”

When schools received an official notice regarding COVID-19 response from the Office of Education, school nurses handled the official notification in most schools. Therefore, they felt the burden of infectious disease work. The school nurse is the only person who can take responsibility for the infectious disease task

at school. They are the only health practitioner and infectious diseases experts at this location; therefore, they have to make decisions alone without support and discussion with colleagues. School nurses are the general managers of infectious disease management; however, they do not have the appropriate authority. This meant that it was difficult to perform the role of infectious disease manager properly.

“Because of COVID-19, all the work is my job. Even if you mention only ‘co’ or ‘c’ of Corona, everyone sends me an official letter.” (School Nurse 3)

Table 2. Open and Axial Coding Results.

Open coding		
Subcategory	Category	Axial coding
Heavy infectious disease-related workload	Excessive responsibility	Casual conditions
Acting as a healthcare worker		
A lot of responsibility issues		
School nurse shortage in school	Shortage of manpower due to single-person work	
Lack of experts with school field experience within the office of education		
Difficulty in ordering work	Lack of authority	
Lack of decision-making power		
Staff's lack awareness of infectious diseases	Lack of awareness of infectious diseases	
Parents' lack of awareness of infectious diseases		
Lack of consistency in public health center policies	Lack of administrative support	Contextual conditions
Inadequate administrative support from the office of education		
Manual that does not fit the school	Insufficient manual	
Frequent changes to the infectious disease manual		
Discord of guidance from the office of education and the health service		
Thinking about how to respond	Solitary struggle Painstakingness	Phenomenon
Fully occupied with work		
Overburden at responsibility		
Fear of an infectious disease outbreak		
Information sharing at public health centers	Work-related networking activation	Intervening conditions
Help from the school nurse group		
Appropriate division of work	School-level support	
Active manager support		
Collaboration in the decision-making process		
Modeling compliance with infectious disease prevention rules	Taking the lead as a control tower	Action/reaction strategies
Proactively presenting opinions		
Utilizing know-how to respond to various infectious diseases	Giving trust as an infectious diseases expert	
Check carefully and meticulously		
Infectious disease prevention education	Improving awareness of infectious disease through health education	
Ongoing staff training		
Psychological support		
Collaborate with the homeroom teacher	Communicate and collaborate	
Active communication with parents		
Help of quarantine personnel		
Cross-departmental support		
Prepare a manual suitable for school	Establishment of school infectious disease response system	
Provide infectious disease work protocol		
Composition of the infectious disease council		
Presence as an expert	The reward of being a school nurse	Results
Demonstrate high competency as a health practitioner and educator		
Received thanks		
Strengthening professionalism through education	Enhancement of competence as an infectious diseases expert	
Confidence in responding to infectious diseases		
Low self-esteem	Exhaustion due to continued sacrifice	
Work stress		
Fatigue of life		

“Homeroom teachers send students to the school nurse room if they have symptoms. When students arrive, I have to determine whether the student’s symptoms are related to infectious diseases or not. This in itself is stressful.” (School Nurse 9)

“In the case of a national infectious disease crisis such as the corona epidemic, when the Office of Education considers school health, it seems that dispatched teachers or specialized personnel who are school nurses and who know the school site well are needed.” (School Nurse 6)

“It was difficult to ask for support because I don’t have the authority to do that. I’m not the head teacher, and I’m not in a position where I can get support from anyone.” (School Nurse 13)

Contextual Conditions for School Nurses’ Experiences in Response to Infectious Diseases. Contextual conditions are special conditions that create situations or problems that affect the central phenomenon.²⁰ The contextual conditions revealed by our analysis were “lack of awareness of infectious diseases among school members,” “lack of administrative support,” and “insufficient manuals.” School administrators (principal and vice-principal), school staff, students, and parents did not know how to deal with infectious diseases in schools. School districts and public health centers, which had to support schools, created a lot of unnecessary administrative work, which caused school nurses more difficulty than help. In addition, despite the fact that schools are a public institution that must carry out work according to the instruction manual, the manual delivery was delayed and guidelines were extensive; therefore, it was difficult to apply these guidelines immediately. Moreover, it was confusing because some of the content that did not match the field.

“It was difficult for me to buy a mask. The mask I ordered in February arrived in June. The school district only gave me the budget, and the school told me to find something and report it.” (School Nurse 15)

“For students suspected of having an infectious disease, I have to accurately check their body temperature again and ask about their symptoms. I think it’s a system where school nurses don’t care about their work. If the school nurse was pregnant, I wonder who would have played such a dangerous role in that school.” (School Nurse 10)

“I am the only school nurse. Although I am alone, I am the person who manages quarantine and children’s health at the top like this. I think the education office is providing support so that school nurses managed by schools can do well with infectious diseases, but I don’t think the education office can do that right now.” (School Nurse 6)

“I have been informed about the prevention of infectious diseases several times. However, I think the teachers do not understand the concept well. For example, even though I kept telling teachers to wear a mask, wash their hands well, and keep a distance without

going to meetings, these guidelines were not followed.” (School Nurse 3)

Interventional Conditions for School Nurses’ Experiences in Response to Infectious Diseases. Interventional conditions can be considered as the broader structural context of a phenomenon. They work to influence action/interaction strategies taken within a particular context.²⁰ The interventional conditions of this study were “worked-related networking activation” and “school-level support.” School nurses exchanged information with each other from different local schools. They understood each other’s situations and provided psychological support. Public health centers are established at the local level. Schools follow their guidelines under the jurisdiction of the local health centers. As COVID-19 spread, public health centers provided services to prevent the local spread of COVID-19. Examples included the management of residents and local medical institutions, telephone consultations, contact tracing, inducing close contact testing, self-quarantine management, and screening. We are in the process of setting up a clinic and conducting screening tests. As an institution belonging to the public health center that manages health in these areas, the school cooperates with the health center’s quarantine work and receives support from the public health center. Occasionally, the administrators actively supported and encouraged the school nurses to perform their duties. This made the school nurses feel that they were not alone, and it was judged that this allowed them to continue their work.

“Every time the school nurses made an inquiry to the health center manager through messenger, they answered everything according to the situation. In this area, the health center manager ensured we were well informed about what to do if a situation arises.” (School Nurse 3)

“Starting this year, we have created an SNS meeting between school nurses in the same area. We created a chat room with our local school nurses. So, we shared information about where we could get masks, and we helped each other when we asked how to deal with official messages. These things helped a lot.” (School Nurse 15)

“The principal and vice-principal divided the detailed tasks related to the response to infectious diseases to the staff. So, my workload was reduced a bit.” (School Nurse 10)

Action/Interaction Strategies of School Nurses’ Experiences in Response to Infectious Diseases. Action/interaction strategies refer to the intentional and explicit actions and internal psychological states used to deal with phenomena.²⁰ The first strategy implemented by school nurses was to respond to the outbreak of an infectious disease; they took initiative and tried to inform the school members about the response plan for the infectious disease. School nurses demonstrated their professionalism as health personnel and tried to carefully check and inspect the school’s infectious disease

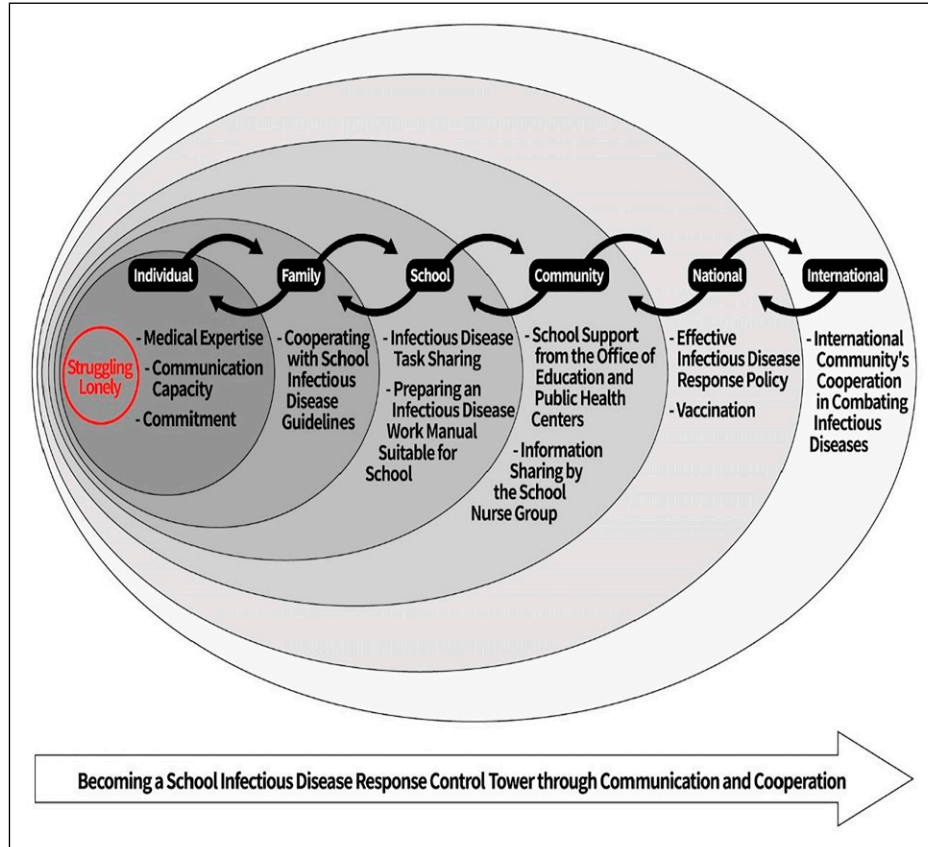


Figure 2. The conditional matrix of school nurses' experiences with infectious diseases.

response system to prevent infectious diseases, giving school members confidence. In addition, school nurses provided health education to students to prevent the spread of the infectious diseases and provided an infectious disease training program for teachers, which required significant effort. All school members, including school nurses and staff, gathered together to discuss the infectious disease system, find problems in the infectious disease response, and devise solutions. In addition, a reasonable and effective response to infectious diseases was possible by creating a school response manual.

“If I had always been in the role of receiving instructions or providing support, this time I was in the role of directing and supervising.” (School Nurse 11)

“What is important to me is educating students on how to wear a mask correctly. When students go to school in the morning, I check their temperature and continue to educate them about infectious disease prevention actions.” (School Nurse 20)

“I attend department-level meetings and talk about things I need to do and inform individuals or seek support. The manager always tells the teachers in the same department to provide training. I also send educational materials to all teachers.” (School Nurse 19)

“The manual has arrived, but it is a manual that is difficult to apply to our school. Therefore, we think about what our school will do and how to apply it through the council and change it.” (School Nurse 6)

Results of School Nurses' Experiences in Response to Infectious Diseases. Outcomes are the direct and concrete product of the action/interaction strategies used to cope with, control, or deal with phenomena.²⁰ School nurses felt satisfaction in keeping the school safe through their efforts to respond to infectious diseases. They memorized the manual and studied the necessary materials on their own, perceiving the responsibility that the safety of the school depends on their own response efforts. When they returned to their daily routines following a busy and urgent situation that was approaching extreme crisis, they experienced an increase in their work capacity and gained confidence in responding to infectious diseases. By contrast, no matter how hard they worked, their results were not revealed, they were not recognized, and responsibility continued to increase.

“Of course, it was difficult, but I think it is true that I have grown a lot as a school nurse through this situation. As I am an expert on infectious diseases at school, I was in a situation where I had to know and deal with this situation well, so I studied more and

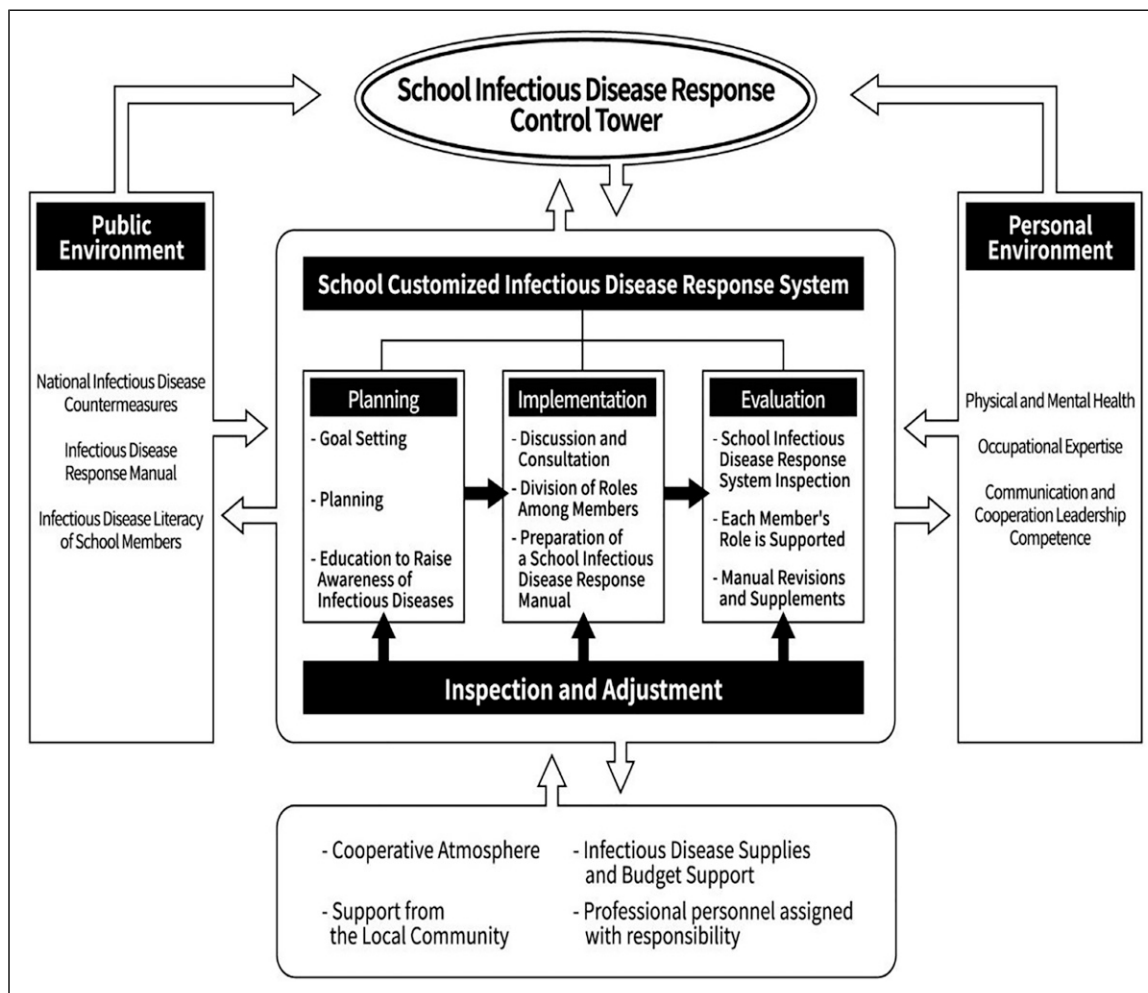


Figure 3. School infectious disease response control tower model.

continued to look at the guidelines. I think I put a lot of effort into giving an accurate answer when someone asked me a question.” (School Nurse 11)

“I think I felt that my capabilities improved after I dealt with the outbreak of infectious diseases. After experiencing extreme situations, I feel like I have grown significantly. After that, when I returned to my daily life, everything seemed easy. I think the threshold has risen that much. It felt like my abilities had improved.” (School Nurse 17)

Selective Coding

Core Category: *Become a School Infectious Disease Response Control Tower Through Communication and Cooperation.* Analysis revealed this core category, which integrates the categories derived from the school nurses’ experiences in responding to infectious diseases: “becoming a school infectious disease response control tower through communication and cooperation.” In selective coding, a conditional matrix that explained the circumstances surrounding the core category was derived.

The situational model is the last step in explaining how various situational conditions related to the central phenomenon of the study affect the results in relation to action/interaction strategies according to micro and macro conditions.²⁰ (Figure 2) shows the situation model for the process of a school nurse responding to an infectious disease by “becoming a school infectious disease response control tower through communication and cooperation.” The situational model of this study is presented at the individual, family, school, local community, national/social level, and international level (Figure 2).

The individual level included “health expertise,” “communication capacity,” and “commitment.” The family level included “cooperating with school infectious disease guidelines,” and the school level included “infectious disease task sharing,” and “preparing an infectious disease work manual suitable for school.” The local community level included “school support from the Office of Education and public health centers” and “information sharing by the school nurse group.” Finally, the

national level included “effective infectious disease response policy” and “vaccination,” and the international level included ‘international community’s cooperation in combating infectious disease.’

Conceptual Framework for School Nurses’ Experiences and Roles in Responding to Infectious Diseases. (Figure 3) shows the conceptual framework by synthesizing the categories and hypotheses derived from this study. The conceptual framework of “becoming a school infectious disease response control tower through communication and cooperation” in this study was composed of a “school infectious disease response control tower” model. This integrated all categories, subcategories, concepts, and story outlines. In this model, the concept was composed of “public environment,” “personal environment,” and “school customized infectious disease response system.” This conceptual framework means that these 3 concepts are critical elements in a school infectious disease response control tower. The public environment includes national infectious disease countermeasures, the infectious disease response manual, and infectious disease literacy of school members. Further, the personal environment includes concepts of physical and mental health, occupational expertise, communication, cooperation, and leadership competency.

A customized infectious disease response system consists of planning, implementation, and evaluation. In the planning stage, the concepts of goal setting, planning, and education are included to raise awareness of infectious diseases. The implementation phase includes the concepts of discussion and consultation, division of roles among members, and preparation of a school infectious disease response manual. In the evaluation stage, the school’s infectious disease response system is checked, each member’s role is supported, and the response manual is revised and supplemented. Monitoring and feedback are provided through inspection and adjustment at each stage of planning, implementation, and evaluation. In addition, “the cooperative atmosphere of the school” and “support from the local community” have an impact. Additionally, “infectious disease supplies and budget support” and “professional personnel assigned with responsibility” have an effect. These components were included to complete the conceptual framework of the “School Infectious Disease Response Control Tower.”

Discussion

This study aimed to develop a substantive theory of school nurses’ infectious disease response experiences by exploring the process of responding to infectious diseases, deriving variables related to the nature of the infectious disease response experience, and identifying the relationship between each concept.

Our results highlighted that additional school nurses with school field experience should be assigned to the Office of Education. Reports of additional school nurses or health

professionals being assigned to school health sites during epidemics are rare.²¹ School nurses positively impact school education and health promotion and have expertise in data assessment, emergency preparedness planning, and equitable distribution of health services.²² Therefore, school nurses with experience in responding to school infectious diseases should be assigned to schools and educational institutions that supervise them. In the event of a pandemic, the role of the Office of Education should focus on the school situation and provide appropriate support for schools to respond to infectious diseases. This study showed that the school site was very chaotic because public officials who had no experience in responding to infectious diseases could not properly support the school by taking on infectious disease-related work at the local education office. We found a need for an expert support policy to immediately help and support difficulties in the school via the placement of health professionals with medical insight and educational experience on the school site.

Second, schools should have additional school nurses. During a pandemic, there are many challenges for a single school nurse to handle. They manage the entire school and interact face-to-face with students; therefore, the minimum requirement is 2 full-time school nurses who are responsible for managing the school’s infectious disease. In a study by Ko,²³ school nurses said that working stress is high because only 1 school nurse is assigned regardless of the size of the school and the workload was excessive. In a study analyzing the job stress of school nurses according to school size,²⁴ school nurses reported excessive work in large schools, which significantly contributed to job stress. In addition, Oh and Kwon²⁴ mentioned the need for 2 school nurses in this study, which highlighted that the job stress increased with increasing class number.

Third, it is necessary for the national and regional offices of education to quickly prepare specific manuals that establish a smooth infectious disease response system. These guidelines are often very detailed and difficult to implement. Moreover, many documents have shifted most of the responsibility to the school.²⁵ The Pandemic School Management Guidelines have been developed by adapting the first stage framework of the international guidelines to the national level. Next, the second stage framework is adapted from the national level to the local level. The manual and processes should be detailed; however, creating this manual can be very complicated and time-consuming.²⁶ Previous studies have concluded that it is important to disseminate suitable manuals to the appropriate groups responding to infectious diseases. Additionally, detailed, clear, and consistent manuals should be prepared for areas with a high workload.^{27,28} Therefore, quick distribution with clear and specific instructions are required after inspection to ensure no problems with its immediate use. This manual will serve as a basic stepping stone to directly increase school attendance for students’ health and well-being, engage students in education, and improve health outcomes.²⁹

Fourth, we found that school nurses took the initiative to respond to infectious disease outbreaks and tried to inform school members of the direction of response to infectious diseases. In the study of Jun and Lee,³⁰ school nurses played the role of a control tower in the school during an outbreak of infectious disease. School nurses developed the knowledge of health experts and gave confidence to the members by providing a professional appearance with meticulous verification and inspection efforts. A study of COVID-19 response among health professionals in 14 countries found that electrostatic disease prevention education was an effective strategy to combat fake news.²¹ Due to the pandemic, reduced physical activity, irregular sleep patterns, unbalanced diet, long-term stress, and isolation negatively affected the health of students.¹⁸ The actions of nurses in schools showed that health education played an important role in promoting physical activity, nutritional habits and social interaction, and developing healthy coping skills.³¹ Health professionals during the pandemic had a significant impact on supporting student health through distance learning about health.^{32,33}

Fifth, it is necessary to prepare an environment and policies for school nurses to improve school health in a pandemic situation. The schools' role as a health promotor was necessary during situations that negatively affect student physical and mental health. Following the World Health Organization (WHO) recommendations, the role of leading health promotion and improving the health and well-being of the school community as a healthy school has become more urgent.³⁴ The Health Promoting School (HPS) model can provide a valuable framework for developing a vision to guide health and education systems based on quality, equity, and well-being.³⁵ The WHO-European Technical Advisory Group recommendation for schooling during COVID-19 confirms that "the principles of the School of Health Promoting in a pandemic are even more important."³⁶ The HPS approach aims to transform individuals and organizations. School nurses are expected to provide health education, outreach programs, and services. This recognizes that all aspects of the school can affect students' health. In particular, the school could motivate students to improve their health by providing technology and equipment for low-income students who do not have equal access to health resources US Centers for Disease Control and Prevention.³⁷ Therefore, preventing infectious diseases in schools will not simply stop with preventing contagious diseases but will require a school health program strategy to enhance health equity.

Sixth, appropriate compensation should be provided for the efforts and sacrifices of school nurses. They are required to deal with patients who are suspected and confirmed to have an infectious disease at close range. Therefore, they have higher exposure and risk of infection in the absence of risk pay. In addition, school nurses were given the lowest level of incentives because they were not recognized for the specificity and skill of their health work, even though they exhaust their physical and mental strength when responding to infectious

diseases. It is necessary to provide financial compensation, special leave, and treatment programs that can restore the mental health of school nurses. In addition, the ability of school nurses to persist despite difficulties in performing their duties is influenced by the formation of a professional identity rather than actual knowledge or skills.²² Therefore, it is necessary to implement a program that helps to establish their professional identity, which can reduce job stress.^{22,36}

Finally, communication and networking with members of the school and related organizations were important in this study. School nurses tried to devise a solution to the problems of responding to infectious diseases and form a consensus by gathering all the school staff together and talking. A study on the competency of school nurses also emphasized their ability to communicate and collaborate with students, faculty, and community resources.³⁷ Through this, it was possible to prepare an infectious disease response manual that was suitable for schools to help them respond rationally and effectively to infectious diseases. Moreover, previous studies have mentioned the importance of positive partnerships between schools, families, local governments, and teachers to prevent infectious diseases and the normalization of schools.²¹ Furthermore, the importance of social mobilization, even between regions, according to health promotion principles has not been addressed. Therefore, governance should be established through the coordination and support at the regional and national levels.²⁹

Conclusion

After the pandemic, the important role of school nurses in school health has been increasingly recognized; however, they have been suffering from safety-net services and a lack of funds.³⁸ The NASN 21st Century School Nurse Framework stated that school nursing practice should be performed during the COVID-19 pandemic situation, focusing on the principle of evidence-based practice decision.³⁹ It is essential that school nurses support each other and receive professional support via nurses' associations, local doctors, public health officials, and emergency room providers.⁴⁰ Therefore, school nurses should concentrate on cooperating and supporting each other within schools and communities.

In this study, we sought to understand the essence and meaning of the psychological and social experiences of school nurses, who are the school's infectious disease managers during an epidemic. We explored the experience of responding to infectious diseases using direct interviews with nurses. This analysis is not limited to the macroscopic position of school nurses' experiences in response to infectious disease disasters; it provides the basic data required for preparing necessary the improvement measures by examining the subjective and internal reflections of the individual. In addition, this work can be used as bottom-up policy data to understand the current situation of school infectious disease management through the voice of school nurses. Further, it

can be used to prepare for problems and develop improvement measures in the response system for infectious diseases in schools.

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Ethical Approval

This study was approved by the institutional review board of the researchers' organization. The ethical approval code (IRB number) is 1041078-202003-HRSB-068-01.

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