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Relationship Between Nursing Students' Awareness of Disaster, Preparedness for Disaster, Willingness to Participate in Disaster Response, and Disaster Nursing Competency

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Abstract

Objective: This study was conducted to provide basic data for preparing a disaster nursing education program. It examined the degree of nursing students' disaster awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency, aiming to determine the relationship between these attributes.

Methods: This was a descriptive research study. The participants were 163 nursing students. The data collected from the participants were analyzed via descriptive statistics and Pearson's correlation coefficients.

Results: Disaster awareness showed a positive correlation with a willingness to participate in a disaster response. Further, disaster preparedness and willingness to participate in a disaster response showed a positive correlation with disaster nursing capacity. Disaster awareness did not show a significant correlation with disaster preparedness and disaster nursing competency. Last, disaster preparedness did not show a significant correlation with willingness to participate in a disaster response.

Conclusions: It is necessary to improve nursing students' disaster awareness, disaster preparation, disaster response participation willingness, and disaster nursing competency. It is imperative to develop disaster nursing education programs to strengthen students' capabilities in a comprehensive manner.

Climate change and rapid urbanization lead to an increase in the frequency and severity of disasters,^{1,2} causing further economic loss, severe environmental destruction, psychological trauma to survivors, numerous injuries, and deaths.^{3,4} Since a disaster leads to many casualties over a short period, it is necessary to prepare for national disasters and have countermeasures in place. As medical support emerges as a key element of disaster response, the competencies of health care workers and their participation in disaster response are becoming highly important.^{5,6}

Nurses perform first aid and nursing interventions during the initial disaster response. The International Council of Nurses specifies the role of nurses in disaster situations,⁷ emphasizing the required, relevant competencies.⁸ With the recent spread of coronavirus disease (COVID-19) in the world, the role of nurses in universal health coverage has been highlighted by the World Health Organization. Thus, nurses' disaster response competencies are being emphasized throughout the entire process of disaster response and management.⁹

For nurses to be on the field and demonstrate their expertise in the event of a disaster, they should receive systematic training on the theory and practice of disaster nursing as part of the university curriculum.^{10–12} In the United States, disaster nursing is included in regular college courses to strengthen disaster nursing competency.^{13,14} After Japan's experiences of serious disasters such as earthquakes, tsunamis, and the Fukushima nuclear disaster, disaster nursing education has been introduced in university and graduate school curriculum.¹⁵

In South Korea, a number of nursing colleges opened an elective course, Emergency and Disaster Nursing, before 2013,¹¹ while Safety and Disaster Nursing has been added to the community nursing course.¹⁶ However, community nursing courses are limited to theoretical education, such as the concept of disasters, disaster management systems and principles, and ethics, with limited practical application.¹⁶ Nurses who have not received adequate training in disaster nursing may be unable to fulfill their roles adequately as workers in disaster situations, leading to severe stress and fear among them.¹⁷ Accordingly, nursing students are future nurses who need to build disaster nursing competencies.¹⁸

For nurses to take their role in disaster situations seriously, it is important that they have a good level of disaster awareness.¹⁹ Disaster awareness refers to the level of understanding of disasters and awareness of safety management during disasters,²⁰ significantly impacting the

overall disaster management, such as disaster preparedness, response, and recovery in the future.²⁰

Disaster preparedness is the ability to prepare adequately and in advance for a large-scale disaster that occurs suddenly, aiming to respond quickly to minimize damage^{21,22} and to prepare individual and national countermeasures for disasters.⁵ The National Student Nurses' Association highlighted the need to prepare for disasters at the individual, family, and nursing curriculum levels for nursing students, emphasizing the importance of disaster preparedness education.²³

Willingness to participate in disaster response is an individual's voluntary willingness to participate in it.²⁴ Although nurses' role in disaster response is particularly important, not all nurses are willing to participate.²⁵ Ben Natan et al.²⁶ found that 57% of 300 nursing students participating in an internship and nurses working at an Israeli general hospital were willing to participate in a disaster response in the event of an earthquake. According to Choi,²⁴ only 21.4% of the nurses at the emergency medical centers in the 4 regions of South Korea were willing to participate in the response to radiation accidents. This lack of willingness to participate in a disaster response leads to a shortage of health care workers in disaster situations.

Disaster nursing competency means effectively performing nursing by utilizing the knowledge and skills necessary to save the lives of people who have been affected by a disaster.⁸ Nursing activities required in disaster situations are different from those in general hospitals.²⁷ Various nursing activities, such as immediate medical judgment, nursing,^{28,29} first aid, and mental health counseling, sometimes have to be performed in situations with insufficient patient information, due to the disaster's nature.³⁰

Several studies have been conducted on disaster experience, disaster awareness, disaster nursing awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency among nursing students in Korea and abroad.^{1,10,12,20,31-39} While most of the studies conducted abroad investigated the perception of disaster preparedness^{35,36} and the willingness to participate in disaster response,^{38,39} several studies conducted in South Korea have confirmed the relationship among disaster awareness, disaster preparedness, and disaster nursing competency.^{1,10,31-34} Only 1 study has examined willingness to participate in disaster response,³⁷ while, to the researchers' knowledge, none have been conducted after the COVID-19 outbreak. Furthermore, few studies have explored the willingness to participate in a disaster response, and few studies have confirmed its relationship with disaster awareness, disaster preparedness, and disaster nursing competency.

Therefore, this study aims to provide the basic data necessary to develop a disaster nursing education program for nursing students by examining their disaster awareness, disaster preparedness, willingness to participate in a disaster response, and disaster nursing competency. Further, it seeks to identify the relationship among these variables and understand the changes in this relationship since the COVID-19 outbreak.

Methods

Study Design

This is a descriptive study designed to identify the relationship between disaster awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency of nursing students.

Participants

The participants of this study included students enrolled in 2 nursing colleges located in B city and 3 nursing colleges located in G province in South Korea. The number of samples was calculated using G*Power 3.1 software (<https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower>). As a result of applying correlation analysis and calculations based on a 2-sided test, an effect size of 0.30 (medium effect size), a significance level of 0.05, and a power of 0.95, the minimum required number of samples was 134. To prevent spreading COVID-19, data were collected through a remote survey via Google Forms. With the dropout rate set at 15%, the survey was finally conducted with 163 nursing students. A total of 148 copies of the questionnaire were included in the final analysis, excluding 15 copies with insufficient or non-responses.

Measures

General characteristics questionnaire

This questionnaire comprised 9 items: gender, year of college, academic performance, family living situation, health issues, clinical practice experience, clinical practice department, clinical practice satisfaction, and satisfaction with their major.

Disaster-related characteristics questionnaire

This questionnaire comprised 4 items: disaster experience, type of disaster experienced, experience of completing disaster education, and type of disaster education.

Disaster awareness

Lee Young-ran et al.'s²⁰ scale to measure nursing students' disaster awareness was modified and supplemented. This scale comprises 20 items: 8 items related to disaster responsibility and authority regarding whether individuals, local governments, and the state are responsible for disaster management; 6 items on disaster management status of disaster prevention, disaster response, and recovery; and 6 items on the disaster cause. In this study, a total of 19 items were used after excluding the item, "I am willing to participate in activities to help victims of safety accidents and disasters," as it was judged to overlap with the items on willingness to participate in disaster response. This scale was scored on a 5-point Likert scale, from 1 ("strongly disagree") to 5 ("strongly agree"). Scores ranged from 19 to 95, with higher scores indicating a higher level of disaster awareness. The Cronbach's α score was 0.80 in the study by Lee Young-ran et al.²⁰ and 0.89 in this study.

Disaster preparedness

Schmidt et al.'s²³ scale to measure nursing students' disaster preparedness (modified and translated by Kim Hee-jung³¹) was modified and supplemented. This scale comprises 15 items. For each item, 1 point was given for "yes," and 0 points were given for "no" and "I do not know." Scores ranged from 0 to 15, with higher scores indicating a higher level of disaster preparedness. The reliability of the scale was not specified by Schmidt et al.²³ However, the Cronbach's α was 0.87 in the study by Kim,³¹ and 0.76 in this study.

Willingness to participate in a disaster response

Qureshi et al.'s⁴⁰ scale to measure health care workers' willingness to participate in a disaster response (modified and translated by Choi²⁴) was modified and supplemented in terms of the disaster situation scenarios and disaster regions examined. The scale by

Choi²⁴ presents 8 scenarios, including heavy snowstorms, floods, chemical plant fires (hazardous substances), explosive terrorism attacks, earthquakes (building collapse), radioactive leaks, the Middle East respiratory syndrome (MERS) outbreak, war-related local provocations, and full-scale wars. In this study, considering the current domestic situation, the MERS scenario was modified to the outbreak of a new infectious disease, such as COVID-19; the disaster region was modified to the region of residence or nearby area. For each item, 1 point was given for “yes” and 0 points for “no” and “I do not know.” Scores ranged from 0 to 8, with higher scores indicating a higher level of willingness to participate in a disaster response. The reliability of the scale was not specified by Qureshi et al.⁴⁰ or Choi.²⁴ However, in this study, the Kuder-Richardson Formula 20 score was 0.84.

Disaster nursing competency

This study used Noh’s⁴¹ disaster nursing competency scale for nurses, based on the International Council for Nurses framework for Disaster Nursing Competencies presented by the International Association of Nursing⁴² along with a 44-item Emergency Preparedness Questionnaire⁴³ developed by Wisconsin Health Alert Network in 2003. This scale was scored on a 5-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Scores ranged from 15 to 75, with higher scores indicating a higher level of disaster nursing competency. The Cronbach’s α was 0.94 in the study by Noh,⁴¹ 0.90 in that by Ahn and Kim,³⁴ and 0.93 in this study.

Data Collection

This study was conducted after receiving approval from the institutional review board (IRB) of Pusan National University (2021_65_HR). The data used for this study were collected from July 21, 2021, to September 15, 2021. After contacting the nursing department of the university where the data would be collected and explaining the purpose and method of data collection, the recruitment notice was distributed by the institution via email, with the consent of and cooperation from the department head. After reading the recruitment notice, the nursing students who wished to participate in the study contacted the author. The participants’ mobile numbers were also collected. With the approval of the Pusan National University Bioethics Committee, the written consent procedure was exempted, as there was a risk of virus transmission if the author were to attempt to obtain written consent from the participants. The level of risk to participants was judged to be low without written consent. The author sent the participants a link to a Google Forms questionnaire containing the research description and survey contents through a text message. The survey took an average of 10–15 minutes for participants to complete, and a convenience store gift card was sent through another text message as a reward for participating in the study. The collected data and the mobile numbers of the participants were kept on a computer in a place accessible by the author only. After the completion of the study, these data will be stored for the 3 years stipulated by the IRB and then discarded.

Data Analysis

The collected data were analyzed using SPSS/WIN 28.0 software (IBM Corp, Armonk, NY). First, the frequency and percentages were calculated for participants’ general and disaster-related characteristics. The average and standard deviation of participants’ disaster awareness, disaster preparedness, willingness to participate in

a disaster response, and disaster nursing competency were calculated. The correlation between the participants’ disaster awareness, disaster preparedness, willingness to participate in a disaster response, and disaster nursing competency was analyzed using Pearson’s correlation coefficients.

Results

General and Disaster-related Characteristics of Study Participants

Table 1 shows participants’ general and disaster-related characteristics.

Participants’ Disaster Awareness, Disaster Preparedness, Willingness to Participate in a Disaster Response, and Disaster Nursing Competency

Disaster awareness

The average total disaster awareness score was 69.39 ± 9.46 . The average score for disaster awareness was 3.63 ± 0.49 out of 5 points. The scores by domain are shown in Table 2.

Disaster preparedness

The average score of participants’ disaster preparedness was 2.88 ± 2.74 . The scores for each item are shown in Table 3.

Willingness to participate in a disaster response

The average score of participants’ willingness to participate in a disaster response was 4.78 ± 2.54 . The frequency (%) of the participants reporting being “willing to participate” in a given disaster scenario is shown in Table 4.

Disaster nursing competency

The average score of participants’ disaster nursing competency was 46.19 ± 9.49 . The scores for each item are shown in Table 5.

Correlation Between Participants’ Disaster Awareness, Disaster Preparedness, Willingness to Participate in a Disaster Response, and Disaster Nursing Competency

Participants’ disaster awareness did not have a significant correlation with disaster preparedness and disaster nursing competency but had a significant positive correlation with willingness to participate in a disaster response ($r = 0.21$, $p = 0.011$). The higher the disaster awareness, the higher the willingness to participate in a disaster response. Disaster preparedness did not have a significant correlation with willingness to participate in a disaster response but had a significant positive correlation with disaster nursing competency ($r = 0.46$, $P = < 0.001$). The higher the disaster preparedness, the higher the disaster nursing capacity. Willingness to participate in a disaster response had a significant positive correlation with disaster nursing competency ($r = 0.19$, $P = 0.022$; Table 6).

Discussion

This study attempted to provide the basic data necessary to develop a disaster nursing education program by examining nursing students’ disaster awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency. It also sought to identify the relationship between these attributes. The main research results are discussed as follows.

Table 1. General and disaster-related characteristics of study participants (N = 148)

Characteristics	Division	n (%)
Gender	Male	25 (16.9)
	Female	123 (83.1)
Year of college	First year	10 (6.7)
	Second year	25 (16.9)
	Third year	47 (31.8)
	Fourth year	66 (44.6)
Academic performance (average GPA)	4.0 or higher	27 (18.2)
	3.5 to under 4.0	57 (38.5)
	3.0 to under 3.5	50 (33.8)
	Under 3.0	14 (9.5)
Living with family	Yes	132 (89.2)
	No	16 (10.8)
Health problems	Yes	28 (18.9)
	No	120 (81.1)
Major satisfaction	Yes	102 (68.9)
	Neutral	46 (31.1)
	No	0 (0.0)
Clinical practice experience	Yes	73 (49.3)
	No	75 (50.7)
Clinical practice department* (n = 73)	Intensive care unit	20 (19.8)
	General ward	73 (72.3)
	Other	8 (7.9)
Clinical practice satisfaction	Yes	34 (46.6)
	Neutral	39 (53.4)
Disaster experience	Yes	96 (64.9)
	No	52 (35.1)
Type of disaster* (n = 96)	Typhoons	60 (40.8)
	Floods	20 (13.6)
	Earthquakes	58 (39.5)
	Fires	9 (6.1)
Disaster education experience	Yes	60 (40.5)
	No	88 (59.5)
Disaster education type* (n = 60)	Lectures	45 (61.7)
	PBL education	9 (12.3)
	Map training	6 (8.2)
	Field training with meta-patient	13 (17.8)

*Multiple responses.

Table 2. Total score of disaster awareness and scores by domain (N = 148)

Variables	M ± SD
Disaster awareness	69.39 ± 9.46
Awareness of responsibility and authority for disaster and management	4.28 ± 0.67
Awareness of legislative, administrative, and judicial aspects for disaster management	3.14 ± 0.74
Awareness of disaster prevention, preparation, response, and recovery	3.27 ± 0.77
Awareness of safety and disaster management actions	3.56 ± 0.74
Awareness of safety and disaster management activities	3.89 ± 0.67
Total	3.63 ± 0.49

Table 3. Total score of disaster preparedness and scores by item (N = 148)

Variables	M ± SD
Disaster preparedness	2.88 ± 2.74
Have you ever discussed how to respond to a disaster with your colleagues or the faculty?	0.27 ± 0.45
Have you been trained about disasters by professors at your university?	0.28 ± 0.45
Have you ever discussed what to do in a disaster with your colleagues or faculty in the absence of the faculty?	0.13 ± 0.34
Do you personally have a disaster preparedness plan?	0.28 ± 0.45
Does your nursing education include a "disaster plan"?	0.22 ± 0.41
Have you ever been trained about an alternative location for the class in the event of a disaster by the faculty?	0.14 ± 0.34
Do you know the disaster plan of the school you are currently attending?	0.09 ± 0.29
Have you ever heard of a Go Bag (disaster preparedness survival backpack)?	0.41 ± 0.49
Do you have disaster preparedness supplies? (backpack, food, water, clothing, flashlight, first aid kit, matches, etc)	0.20 ± 0.40
Do you always pack and prepare necessary items in case of evacuation from a disaster? (eg, gear bag)	0.05 ± 0.21
Do you usually maintain an emergency contact system in case of a disaster?	0.20 ± 0.40
Have you ever practiced disaster evacuation at home (residence, dormitory, etc)?	0.33 ± 0.47
Have you ever practiced disaster evacuation at school?	0.15 ± 0.36
Have you personally prepared shelter at home (residence, dormitory, etc)?	0.07 ± 0.25
Have you personally prepared shelter at school?	0.07 ± 0.25
Total	0.19 ± 0.18

In this study, 64.9% of participants had disaster experience, which is higher than that in prior studies conducted with nursing students in South Korea (27.8%–40.6%).^{10,20} This may have been due to the increase in disaster experience after the earthquake in the Gyeongbuk region and the COVID-19 outbreak. As the types of disasters are changing and diversifying, it is necessary to implement education and training reflecting such changes for nursing students, who are likely to face disaster response situations as nurses in the future.

When participants' disaster awareness score was converted into a score of 100, it was at a medium level: 74. Among the domains, the score was the highest for the *awareness of responsibility and authority for disaster and management*, with a score of 4.28 points. In a previous study examining the level of disaster awareness in domestic nurse cadets, their awareness of responsibility and authority for disaster and management was at a similar level as that in this study (4.32).⁴⁴ These results suggest that nursing students are aware that the state, local government, non-governmental organizations, and individual citizens are all responsible for safety and disaster management. Considering that the score was the lowest for the *awareness of legislative, administrative, and judicial aspects for disaster management* (3.14), the perception that the participants in this study had about the disaster management system

Table 4. Total score of willingness to participate in disaster response and scores by item (N = 148)

Variables		M ± SD	
Willingness to participate in disaster response		4.78 ± 2.54	
Rank	Item	n	%
1	An earthquake occurred in a nearby area, and a large number of people were injured as a building collapsed.	117	79.1
2	A great flood occurred in your area due to torrential downpours during the monsoon season.	108	73.0
3	A disaster occurred at a nearby local hospital, where a group of people were infected by a novel infectious disease such as MERS and COVID-19.	104	70.3
4	A disaster has occurred in your area due to a blizzard with heavy snowfall exceeding 20 cm in 24 hours.	99	66.9
5	An explosive terrorist attack occurred in a nearby area, resulting in a disaster causing a large number of patients.	90	60.8
6	Local provocations and all-out wars threatening the country occurred, resulting in a disaster that resulted in a large number of casualties (eg, Bombardment of Yeonpyeong).	86	58.1
7	A fire broke out at a chemical plant in a nearby industrial complex, releasing toxic substances and causing a disaster that resulted in a large number of patients.	65	43.9
8	A disaster that caused a radioactive leak in a nearby area.	39	26.4

in South Korea did not appear to be positive. As nurses must fulfill their roles and responsibilities as first responders and direct care providers in the event of a disaster,^{8,45} nursing students should be educated properly to have correct and precise knowledge of the current disaster management system operations in South Korea.

Participants' score for disaster preparedness was an average of 2.88 out of 15 points, the lowest among the disaster-related variables surveyed in this study. Considering each item, the score was the highest for "Have you ever heard of a Go Bag (disaster preparedness survival backpack)?" (0.41 ± 0.49) and the lowest for "Do you always pack and prepare necessary items in case of evacuation from a disaster?" (0.05 ± 0.21). Compared to the study by Kim³¹ (2.14), the disaster preparedness score of this study was relatively high; however, considering that the total score of the tool was out of 15, the scores of both this study and previous studies³¹ were quite low. Hong⁴⁶ studied disaster preparedness in nursing students and found similar results, as scores were also the highest and lowest for the same items. Furthermore, in a study⁴⁷ on disaster preparedness for students of the Department of Nursing and Emergency Rescue, the participants answered that they did not have disaster preparedness supplies, as they believed that a disaster would not occur. Since Korea has rarely experienced war or major earthquakes in history, it is highly likely that Koreans are less alert to disasters. With a gradual increase in the frequency of disasters, the need for disaster preparedness is being emphasized even further.⁴⁸ Therefore, it is necessary to increase and intensify education on this topic by reflecting on the areas of improvement in nursing students' disaster preparedness, not only to provide theoretical education but also to instill disaster preparedness for their future practice.

Table 5. Total score of disaster nursing competency and scores by item (N = 148)

Variables	M ± SD
Disaster nursing competency	46.19 ± 9.49
I am aware of the general measures for responding in the event of a disaster.	3.45 ± 0.77
I am able to provide basic first aid in the event of a disaster.	3.22 ± 0.83
I am aware of the mission of health care workers in the event of a disaster.	3.59 ± 0.97
I am aware of the current disaster-related guidelines at my school.	2.45 ± 0.86
I am aware of the health care system in my community and am able to act as a nursing student in the event of a disaster.	2.99 ± 0.92
As a nursing student, I am able to manage disaster sites through systematic evaluation, supervision, and reporting.	2.88 ± 0.91
I am able to perform nursing according to severity.	3.01 ± 0.91
I am able to assess nursing problems based on the understanding of the background and situation of patients.	3.18 ± 0.83
I am aware of the procedure for nursing documentation in the event of a disaster.	2.52 ± 0.99
I am aware of the procedure for passing information to other health care workers in the event of a disaster.	2.64 ± 0.95
I am able to collect information and effectively share information with other health care workers.	3.01 ± 0.90
I am able to effectively work with key partners for disaster preparedness.	3.36 ± 0.93
I am able to provide adequate psychological support to all those affected by a disaster.	3.47 ± 0.94
I am able to provide health counseling/ education for people who have suffered a disaster on the long-term effects of a disaster.	3.16 ± 0.90
I am able to provide adequate care to susceptible or vulnerable groups in the event of a disaster.	3.26 ± 0.93
Total	3.08 ± 0.63

Although there have been many reports of differences in the degree of disaster preparedness according to the students' year level in previous studies,^{44,47,49} no significant difference was identified in this study. Since the disaster preparedness scale used in this study consists of items asking about the level of disaster preparedness at schools, there is a limit to comparing the results of this study with the results of previous studies that measured the level of disaster preparedness in daily life. In addition to supplementing the lack of preparedness for disasters at the school level, it is necessary to develop a scale that can measure the level of disaster preparedness not only in schools but also in hospitals and homes, followed by further research.

In terms of the disaster type, the participants of this study expressed the highest willingness to participate in disaster response for earthquakes (79.1%), followed by floods (73.0%) and novel infectious disease outbreaks, such as MERS and COVID-19 (70.3%). In a study on the willingness to participate in a disaster response of nurses at regional emergency medical centers,²⁴ the type of disaster for which nurses expressed the highest willingness to participate was earthquakes (68.9%), followed by floods (65.4%), in line with the results

Table 6. Correlation between participants' disaster awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency (N = 148)

Characteristics	Disaster awareness	Disaster preparedness	Willingness to participate in a disaster response	Disaster nursing competency
	<i>r</i> (<i>p</i>)			
Disaster awareness	1			
Disaster preparedness	-0.00 (0.985)	1		
Willingness to participate in a disaster response	0.21 (0.011)	0.09 (0.276)	1	
Disaster nursing competency	-0.03 (0.689)	0.46 (< 0.001)	0.19 (0.022)	1

of this study. This may have been related to the increased anxiety and awareness of disasters due to small-scale earthquakes in Gyeongbuk, South Korea, since 2016, including Gyeongju and Pohang.

In addition, 70.3% of participants expressed their willingness to participate in a disaster response in situations involving novel infectious disease outbreaks such as MERS and COVID-19. This is low, compared to that in the study by Bainv et al.,⁵⁰ where about 92.8% of nurses expressed a willingness to participate in the response to COVID-19. Conversely, it is higher than that in Choi's study,²⁴ where 53.5% of nurses at regional emergency medical centers expressed their willingness to participate in the response to MERS. The ongoing spread of COVID-19, causing limitations in daily life, may have affected nursing students through the implementation of remote education with limited clinical practice. As the severity of the shortage of health care workers was highlighted in the media, their willingness to participate in disaster response may have also increased.

As for participants' disaster nursing competency, the score was lowest for the item, "I am aware of the current disaster-related guidelines at my school" (2.45). This was in line with the results of the studies by Ahn and Kim³⁴ and Hong,⁴⁶ which used the same scale to examine disaster nursing competency and where the score was lowest for the item, "I am aware of the current disaster-related guidelines at the institution I belong." As such, nursing students lack knowledge of disaster-related guidelines; thus, the reinforcement of related educational contents will be required to enable them to quickly respond according to the disaster response guidelines in the event of a disaster.

The higher the participants' disaster awareness, the higher their willingness to participate in a disaster response. Nursing students with a higher level of disaster awareness exhibited a significantly higher level of intention to participate in disaster nursing activities,¹⁰ and nurses with a higher level of safety awareness were more willing to participate in a disaster response.⁵¹ An individual's willingness to participate in a disaster response may be affected by how much the social system guarantees the safety of each individual when responding to a disaster. Therefore, it will be necessary not only to improve individual disaster awareness through education and training, but also to establish and prepare a system to ensure health care workers' safety during a disaster response.

Furthermore, the higher the participants' willingness to participate in a disaster response, the higher their disaster nursing competency. A study conducted by Choi⁶ with public hospital nurses reported that the disaster response capacity was significantly higher in those with a higher willingness to participate in a disaster response. Liou et al.,³⁸ however, reported that there was no significant correlation between nursing students' motivation to participate in a disaster response and their disaster nursing competency, which differs from the results of this study. Considering the scarcity of studies in South Korea that have

identified the relationship between nursing students' willingness to participate in disaster response and disaster nursing competency, it is necessary to examine the relationship between these elements through further studies.

This study is relevant as it presents basic data for developing an educational program to strengthen disaster nursing capacity by examining the relationship between the disaster awareness, disaster preparedness, willingness to participate in disaster response, and disaster nursing competency of nursing students in South Korea vis-à-vis the changes caused by the COVID-19 pandemic. In addition, this study suggests that disaster education should be provided in undergraduate nursing education. Nursing students should be able to analyze their willingness to participate in a disaster response for each type of disaster, identify their disaster awareness, disaster preparedness, and willingness to participate in a disaster response, and improve their disaster nursing competency, as future nurses.

Limitations

This study had a few limitations. A few of the scales used in this study did not consider the specific characteristics of the participants or the disaster scenario. Furthermore, the content of the disaster preparedness scale was focused on investigating the disaster preparedness at schools in general rather than personal disaster preparedness. In addition, care must be taken in generalizing the results, as the data analyzed in this study were collected from nursing students in certain regions in South Korea. Considering the insufficiency of valid scales to measure disaster-related concepts for nursing students, there seems to be a need to develop relevant measurement scales.

Conclusions

The participants exhibited a medium level of disaster awareness, willingness to participate in a disaster response, and disaster nursing competency. Further, the participants' level of disaster preparedness was severely low. Moreover, the higher the level of disaster awareness, the higher the willingness to participate in a disaster response, and the higher the level of disaster preparedness and willingness to participate in a disaster response, the higher the disaster nursing competency.

In conclusion, with a growing need to improve nursing students' disaster awareness, disaster preparedness, willingness to participate in a disaster response, and disaster nursing competency, it is necessary to develop a disaster nursing education program to develop and strengthen these traits. This is especially significant considering the correlation between these attributes.

Based on these results, this study makes the following suggestions: First, further studies to identify factors affecting nursing students' disaster awareness, disaster preparedness, and willingness to participate in disaster response are required. Second, further studies are needed to develop scales to measure nursing students' disaster preparedness and disaster nursing competency. Third, further studies are required to develop disaster nursing education programs to improve and strengthen nursing students' disaster nursing competency, assessing their effectiveness.

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