

# Disaster awareness and coping: Impact on stress, anxiety, and depression

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## Abstract

**Purpose:** This study examines disaster awareness and coping among college students to identify their influence on stress, anxiety, and depression.

**Design and Methods:** Overall, 291 college students participated. A multiple regression analysis was conducted to analyze the influence of disaster awareness and coping on stress, anxiety, and depression.

**Findings:** In the multiple regression model, anxiety, and depression were influenced by an awareness of natural and social disasters, level of perception of disaster response strategies, and level of information relating to disasters.

**Practice Implications:** It is important to deliver effective information on disaster response and strategies to prevent disaster-related mental health issues.

## KEYWORDS

anxiety, depression, disaster response, stress

## 1 | INTRODUCTION

A disaster is a crisis that can cause large-scale damage to a community and hinder its ability to recover. Korea has faced frequent natural disasters such as heavy rainfall, typhoons, and heavy snow. However, recently social disasters and large-scale accidents have occurred. Some recent incidents include the spread of infectious diseases such as the Middle East respiratory syndrome (MERS), the sinking of the Sewol Ferry, and subway collisions.<sup>1</sup> These diverse large-scale disasters have generated fear and anxiety in the general population and have caused extensive damage. Specifically, the sinking of the Sewol Ferry in 2014 generated massive social criticism and reflections on disaster management. As a result, Koreans expected that the incident would prompt innovative change. However, before a detailed strategy could be formed and implemented, various disasters such as the MERS epidemic of 2015 and earthquakes of 2016 (Gyeongju) and 2017 (Pohang) occurred. Additionally, large fires also devastated the country and took a large number of lives in 2017 and 2018. Furthermore, the global

community has experienced social disasters such as large-scale fires, the spread of infectious diseases, cold waves, heat waves, and heavy rainfall.

Posttraumatic stress disorder (PTSD) is the most common mental disorder experienced by disaster victims, along with acute stress disorder, major depressive disorder, and anxiety disorders.<sup>2</sup> Given that subjective perception of an incident is as important as the nature of the traumatic incident itself, risk factors for posttraumatic stress include both direct and indirect trauma. The development of social media and social networking has made it easier to share the severity and extent of the damage of disasters, which has led to higher levels of indirect exposure, leading to increased risk for stress, anxiety, and depression from indirect trauma.<sup>3</sup>

The recently revised *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5)<sup>4</sup> does not include media exposure to traumatic events as a cause of PTSD. This decision was supported by research which suggests that PTSD cannot be induced by watching the news<sup>3</sup> and that PTSD symptoms decrease with the passage of time after trauma.<sup>5</sup> However, the results have been mixed, and other studies

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found that indirect exposure to news and media could lead to the development of PTSD symptoms.<sup>6</sup> Specifically, Silver et al<sup>7</sup> found that exposure to televised accounts of the September 11th attacks in the United States, combined with information about the War in Iraq, predicted an increase in PTSD symptoms at follow-up 2 to 3 years later.

Multiple studies have been conducted on the mental health of victims directly impacted by disasters<sup>8</sup> and on indirect victims of disasters.<sup>3,6,7</sup> However, little research has been conducted in Korea to study the mental health issues of disaster victims.<sup>9</sup> To date, studies in Korea have focused on medical professionals who have experienced disaster management in the regional community,<sup>10</sup> and on systems of the nation and regional self-autonomous governments.<sup>11</sup> Furthermore, these studies have focused on disaster experience and awareness,<sup>12,13</sup> disaster readiness among college nursing students,<sup>13,14</sup> awareness of disaster safety education in college students,<sup>15</sup> and safety awareness, and safety behaviors in college students.<sup>16</sup> Given that frequent disasters could threaten the mental health of scores of individuals due to indirect trauma, more research is needed. Specifically, in Korea, little has been done to address the relationships between mental health (ie, stress, anxiety, and depression) and disaster-related perceptions, awareness, and coping with disasters. As such the current study aims to understand the presence of disaster-related awareness and coping skills in college students who indirectly experienced trauma. Furthermore, the study aims to explore the influence of these factors on stress, anxiety, and depression.

## 2 | METHODS

### 2.1 | Design

The study participants were college students who were enrolled in large-scale elective courses. After they were informed of the purpose and the methods of the study, a survey was distributed to the students who agreed to participate. The study was conducted between March 10, 2017 and March 20, 2017. Participants took an average of 10 to 15 minutes to complete the survey, and they were asked to return them to a bin. Surveys were distributed to a total of 300 participants, from whom 294 responses were collected; however, three surveys with missing information were removed, making the final number of participants 291.

### 2.2 | Measures

#### 2.2.1 | Disaster awareness and coping

Disasters were divided into natural disasters (ie, typhoons, heavy rain, gales, storms, heat waves, droughts, heavy snows, cold waves, earthquakes, and etc) and social disasters (ie, fires, collapses, explosions, infectious diseases, traffic accidents, nuclear accidents, pollution, and etc). Participants were asked to rate their awareness of these disasters in terms of risk and perceived level of threat (1-10 points, with higher points indicating a higher level of perceived risk). The participants were asked about their experience with disasters and whether they were educated on response strategies to disasters. Participants were asked to respond to questions about disaster

stability (1-5 points, with higher points indicating a higher level of stability), perception of disaster response strategies (1-4 points, with higher points indicating higher perception), level of disaster-related information (1-5 points, with higher points indicating higher level of information), and perception of disaster response ability (1-5 points, with higher points indicating higher perception).

#### 2.2.2 | Stress

Stress was measured using the Korean version of the Perceived Stress Scale;<sup>17</sup> which was revised by Park and Seo<sup>18</sup> to verify its validity and reliability for use with college students. Stress was measured as the extent to which hypothetical situations were perceived as stressful. These situations were divided into two sub-factors of negative and positive perceptions, with five items each, totaling 10 items. The negative perception was measured as the stress experienced when the situation exceeded an individual's capacity to overcome the situation. In contrast, positive perception referred to the perception that the situation did not exceed the individual's capacity. The positive perception was measured in terms of the frequency at which situations that occurred on a daily basis were predictable, controlled reasonably, and successfully resolved. Each item was measured on a five-point Likert scale, with higher scores indicating a higher level of perceived stress. Positive perceptions were measured reversely. Cronbach's  $\alpha$  in the study of Park and Seo<sup>18</sup> was 0.82, and was 0.83 in the present study.

#### 2.2.3 | Anxiety

Anxiety was measured using the Beck Anxiety Inventory (BAI) developed by Beck et al<sup>19</sup> and standardized into Korean by Kwon and Oei.<sup>20</sup> This self-report scale was developed to measure anxiety levels. It is composed of 21-items that measure the cognitive, emotional, and physical domains of anxiety. Each item is measured on a four-point Likert scale ranging from "did not feel anxious at all" (0) to "felt extreme anxiety," (3) with the total possible points ranging from 0 to 63. Based on the Korean version, scores of 21 points or lower were considered to be "not anxious (normal)," 22 to 26 points were classified as "anxious (requiring observation and intervention)," 27 to 31 points were classified as "state of severe anxiety," and 32 points or more indicated "state of extreme anxiety." Thus, higher points indicate higher anxiety; Cronbach's  $\alpha$  in this study was 0.94.

#### 2.2.4 | Depression

Depression was measured using the Center for Epidemiological Studies-Depression Scale (CES-D). The CES-D is a 20-item self-report tool developed by Radloff<sup>21</sup> to study depression in the general population. It measures symptoms experienced over the past week in four stages (0-3 points), with total scores ranging from 0 to 60 points. The tool comprises four factors: depressive emotional factors, positive emotional factors, physical symptoms and flattened behavioral symptoms, and interpersonal relationship factors. This study used the revised Korean version by Chon and Lee<sup>22</sup> scored on a five-point Likert scale, with higher scores indicating higher depression. Cronbach's  $\alpha$  in this study was 0.93.

## 2.3 | Statistical analysis

The collected data were analyzed using IBM SPSS 20.0. First, the general characteristics of the participants were analyzed using a frequency analysis. To confirm control variables, independent samples *t* test and one-way analysis of variance were used to analyze stress, anxiety, and depression according to physical and demographic characteristics (ie, sex, economic status, and body mass index [BMI]). Economic status (ie, low, low-moderate, moderate, moderate-high, and high; 1-5 points) and BMI were treated as quantitative data and were analyzed using simple regression to compare stress, anxiety, and depression. To examine the influence of disaster awareness and coping on stress, anxiety, and depression, these were set as dependent variables. The perceived risk of natural disasters and social disasters, disaster experience, education about disaster response, disaster stability, level of perception of disaster response strategies, level of information about disasters, and level of perception of disaster response abilities were selected as the independent variables. Physical and demographic characteristics such as sex, residence type, and economic status were set as control variables to perform the multiple regression analysis.

## 2.4 | Ethical considerations

The study was approved by the university's Institutional Review Board (no. 1044396-201701-HR-008-01). Ethical guidelines regarding plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy were observed by the author.

## 3 | RESULTS

### 3.1 | Disaster awareness and coping

The natural disasters with the highest perceived risk were earthquakes according to 178 participants (61.6%), followed by typhoons and heavy rain (17.0%), heat waves and drought (9.7%), heavy snow and cold waves (7.6%), and gales and storms (4.2%), respectively. The social disasters with the highest perceived risk were infectious diseases such as MERS and Avian Influenza (AI; 46.2%), followed by collapses and explosions (20.6%), nuclear accidents and pollution (16.4%), traffic accidents (14.7%), and fires and forest fires (2.1%). A total of 4.9% of participants were adversely impacted by disasters, and 82.0% had been educated on response strategies to disasters. The perceived risk of natural disasters (1-10) had an average score of 4.89 and that of social disasters (1-10) had an average score of 6.41. Disaster stability (1-5) had an average score of 3.02, level of disaster response strategies (1-4) had 2.77, amount of information about disasters (1-5) had 2.06, and the level of disaster response skills (1-5) had an average score of 2.23. Stress (1-5) had an average score of 2.91, anxiety (0-3) 0.58, and depression (1-5) 2.58 (Tables 1,2).

**TABLE 1** Descriptive statistics by disaster awareness and coping

Variables	Categories	n	%
Disaster awareness of natural disasters <sup>a</sup>	Typhoons and heavy rain	49	17.0
	Gale and storm	12	4.2
	Heat and drought	28	9.7
	Heavy snow and cold wave	22	7.6
	Earthquake	178	61.6
Disaster awareness of social disasters <sup>b</sup>	Fire and forest fires	6	2.1
	Collapse and explosion	59	20.6
	Infectious disease	132	46.2
	Traffic accident	42	14.7
	Nuclear accident and pollution	47	16.4
Disaster experience <sup>c</sup>	No	273	95.1
	Yes	14	4.9
Disaster response education experience <sup>d</sup>	No	51	18.0
	Yes	233	82.0
Disaster-related stability <sup>e</sup>	Very risky	8	2.8
	Risky	76	26.4
	Average	117	40.6
	Safe	77	26.7
	Very safe	10	3.5
Responding after a disaster <sup>f</sup>	Not aware at all	6	2.1
	Relatively not aware	70	24.2
	Somewhat aware	198	68.5
	Very well aware	15	5.2
Amount of information about disasters <sup>g</sup>	Lacks severely	75	26.0
	Lacks relatively	131	45.3
	Appropriate	76	26.3
	Relatively high	5	1.7
	Very high	2	0.7
Disaster response skills <sup>h</sup>	Not at all	30	10.4
	Very little	173	59.9
	Average	76	26.3
	Moderately high	9	3.1
	Very high	1	0.3

No answer: <sup>a</sup>2, <sup>b</sup>5, <sup>c</sup>4, <sup>d</sup>7, <sup>e</sup>3, <sup>f</sup>2, <sup>g</sup>2, and <sup>h</sup>2.

### 3.2 | Stress, anxiety, and depression according to general characteristics

The study participants included 118 men (40.5%) and 173 women (59.5%). In terms of residence type, 162 were residing with family or relatives (56.4%) and 125 were living independently (43.6%). In terms of economic status, 52 were high-income (18.1%), 166 were middle-income (57.8%), and 69 were low-income (24.1%). In terms of the BMI of the respondents, 30 were low weight (13.3%), 135 were normal (60.5%), 31 were overweight (13.8%), and 29 were obese (12.9%; Table 3).

There were statistically significant differences in stress by sex but no differences in terms of residence type, economic status, or BMI. Female students (2.98) reported more stress than male students (2.84). There were statistically significant differences in anxiety by sex, residence type, economic status, and BMI. Female students (0.66) reported higher levels of anxiety compared with male students (0.50). Students who were living

**TABLE 2** Descriptive statistics by disaster, stress, anxiety, and depression

Variables	Item number	Cronbach's $\alpha$	Mean $\pm$ SD	Max	Min
Awareness of natural disasters (1-10)	1		4.89 $\pm$ 2.06	10.00	1.00
Awareness of social disasters (1-10)	1		6.41 $\pm$ 2.05	10.00	1.00
Disaster stability (1-5)	1		3.02 $\pm$ 0.89	5.00	1.00
Perceived response methods after disasters (1-4)	1		2.77 $\pm$ 0.57	4.00	1.00
Amount of information relating to disasters (1-5)	1		2.06 $\pm$ 0.81	5.00	1.00
Level of disaster response ability (1-5)	1		2.23 $\pm$ 0.69	5.00	1.00
Stress (1-5)	10	0.828	2.92 $\pm$ 0.62	4.70	1.20
Anxiety (0-3)	21	0.943	0.59 $\pm$ 0.58	3.00	0.00
Depression (1-5)	20	0.932	2.58 $\pm$ 0.74	4.70	1.05

independently reported more anxiety (0.68) compared with those who were residing with family or relatives (0.53). Those reporting a higher economic status reported less anxiety. Students with higher BMIs (0.88) had comparatively higher anxiety than students in the other BMI classes. There were statistically significant differences in depression by sex and economic status, but no differences by residence type and BMI. Female students (2.65) reported higher levels of depression symptoms compared with male students (2.47). Reports of depression symptoms were lower among those reporting a higher economic status (Table 3).

### 3.3 | Effects of disaster awareness and coping on stress, anxiety, and depression

Three types of regression analysis models were used to analyze the influence of disaster awareness and coping on stress, anxiety, and depression. The first model (model 1) used statistically significant

variables among the disaster awareness and coping variables as independent variables; stress, anxiety, and depression were set as dependent variables. Model 2 utilized all disaster awareness and coping variables as independent variables. Model 3 added sex, residence type, and economic status as control variables to the analyses conducted in model 2 (Table 4).

The analysis results for the influence of disaster awareness and coping on stress, anxiety, and depression (model 1) indicated that the statistically significant variables were level of perception of disaster response strategies, and level of disaster-related information (stress  $F = 4.390$ ,  $P = 0.013$ ,  $R^2 = 0.030$ ; anxiety  $F = 4.965$ ,  $P = 0.002$ ,  $R^2 = 0.050$ ; depression  $F = 4.268$ ,  $P = 0.005$ ,  $R^2 = 0.029$ ). Model 2 used all disaster awareness and coping variables to analyze their influence on stress, anxiety, and depression. The results showed that the influence on stress was not statistically significant, and that anxiety and depression were influenced by the risk of social disasters, level of

**TABLE 3** Stress, anxiety, and depression according to general characteristics

Variable	n	%	Stress (1-5)		Anxiety (0-3)		Depression (1-5)	
			Mean $\pm$ SD	t, F (P)	Mean $\pm$ SD	t, F (P)	Mean $\pm$ SD	t, F (P)
Sex								
Male	118	40.5	2.84 $\pm$ 0.57	-1.999 (0.047)	0.50 $\pm$ 0.57	-2.315 (0.021)	2.47 $\pm$ 0.74	-2.027 (0.044)
Female	173	59.5	2.98 $\pm$ 0.64		0.66 $\pm$ 0.57		2.65 $\pm$ 0.73	
Residence type <sup>a)</sup>								
With family/relative	162	56.4	2.89 $\pm$ 0.57	-1.206 (0.229)	0.53 $\pm$ 0.55	-2.137 (0.033)	2.53 $\pm$ 0.74	-1.464 (0.144)
Self-boarding (include dormitory)	125	43.6	2.98 $\pm$ 0.68		0.68 $\pm$ 0.60		2.66 $\pm$ 0.75	
Economic status <sup>b)</sup> (1-5, slope)								
High	1	0.3	-0.058	-1.114 (0.266)	-0.128	-2.718 (0.007)	-0.144	-2.338 (0.020)
Moderate-high	51	17.8						
Moderate	166	57.8						
Low-moderate	61	21.3						
Low	8	2.8						
BMI <sup>c)</sup> (kg/m <sup>2</sup> )								
Underweight (<18.5)	30	13.3	2.99 $\pm$ 0.55	1.252 (0.292)	0.66 $\pm$ 0.56	2.947 (0.034)	2.67 $\pm$ 0.72	1.781 (0.152)
Normal ( $\leq$ 18.5-22.9)	135	60.0	2.89 $\pm$ 0.66	0.54 $\pm$ 0.52	2.51 $\pm$ 0.75			
Overweight ( $\leq$ 23-24.9)	31	13.8	3.05 $\pm$ 0.66	0.88 $\pm$ 0.83	2.81 $\pm$ 0.69			
Obesity ( $\geq$ 25.0)	29	12.9	3.10 $\pm$ 0.54	0.65 $\pm$ 0.63	2.75 $\pm$ 0.83			
BMI index (slope)			-0.002	-0.454 (0.650)	-0.002	-0.678 (0.498)	-0.006	-1.324 (0.187)

No answer: <sup>a</sup>4, <sup>b</sup>4, <sup>c</sup>66.

**TABLE 4** Effects of disaster awareness and coping on stress, anxiety and depression

Variable	Stress						Anxiety					
	Model 1 <sup>a</sup>		Model 2 <sup>a</sup>		Model 3 <sup>b</sup>		Model 1 <sup>a</sup>		Model 2 <sup>a</sup>		Model 3 <sup>b</sup>	
	$\beta$	t (p)	$\beta$	t (p)	$\beta$	t (p)	$\beta$	t (p)	$\beta$	t (p)	$\beta$	t (p)
Experience of disasters												
Disaster response education experience												
Disaster awareness of natural disasters												
Disaster awareness of social disasters	.110	1.876 (.062)	.104	1.544 (.124)	.103	1.511 (.132)	.123	2.082 (.038)	.165	2.482 (.014)	.154	2.327 (.021)
Disaster-related stability			.081	1.264 (.207)	.090	1.383 (.168)			.023	.364 (.716)	.051	.805 (.421)
Perceived response methods after disasters	-.144	-2.457 (.015)	-.106	-1.655 (.099)	-.095	-1.455 (.147)	-.110	-1.865 (.063)	-.116	-1.821 (.070)	-.107	-1.682 (.094)
Amount of information about disasters			-.026	-.358 (.720)	-.002	-.032 (.975)	-.126	-2.109 (.036)	-.153	-2.126 (.034)	-.144	-1.994 (.047)
Level of disaster response ability			-.077	-1.070 (.285)	-.062	-.837 (.403)			.050	.704 (.482)	.081	1.124 (.262)
Model F (p)	4.390 (.013)		1.525 (.149)		1.520 (.124)		4.965 (.002)		2.151 (.032)		2.903 (.001)	
Model goodness of fit	.030		.044		.062		.050		.061		.111	
<b>Depression</b>												
Model 1 <sup>a</sup>												
$\beta$	.032	.521 (.603)	.013	.218 (.827)								
t (p)	.000	.001 (.999)	-.022	-.349 (.727)								
	-.102	-1.549 (.123)	-.118	-1.764 (.079)								
	.131	1.951 (.052)	.121	1.793 (.074)								
	.001	.022 (.982)	.018	.277 (.782)								
	-.111	-1.943 (.053)	-.118	-1.830 (.068)	-.111	-1.695 (.091)						
	-.111	-1.852 (.065)	-.106	-1.454 (.147)	-.097	-1.319 (.188)						
	0											
	-.002	-.028 (.977)	.022	.306 (.760)								
	4.268 (.015)	1.693 (.001)	2.036 (.026)									
	.029	.049	.081									

<sup>a</sup>No control variable.<sup>b</sup>Control variable: gender, residence type, economic status.

perception of response strategies to disasters, and level of disaster-related information (stress  $F = 1.525$ ,  $P = 0.149$ ,  $R^2 = 0.045$ ; anxiety  $F = 2.151$ ,  $P = 0.032$ ,  $R^2 = 0.061$ ; depression  $F = 1.693$ ,  $P = 0.001$ ,  $R^2 = 0.049$ ). Model 3 utilized all disaster awareness and coping variables as well as physical and demographic characteristics as control variables to analyze their influence on stress, anxiety, and depression. The results indicated that the influence on stress was not significant. Specifically, anxiety and depression were influenced by an awareness of natural disasters, awareness of social disasters, level of perception of disaster response strategies, and level of disaster-related information (stress  $F = 1.520$ ,  $P = 0.124$ ,  $R^2 = 0.062$ ; anxiety  $F = 2.903$ ,  $P = 0.001$ ,  $R^2 = 0.111$ ; depression  $F = 2.036$ ,  $P = 0.026$ ,  $R^2 = 0.081$ ).

## 4 | DISCUSSION

Regarding the perception of disasters, earthquakes were considered to be the most threatening among natural disasters (61.6%). Considering the timing of the data gathering, the 2016 Gyeongju earthquake, with a magnitude of over 5.8, may have had a significant influence. Although stress symptoms tend to decrease over time after a disaster, the significant exposure to news coverage regarding the earthquake may have influenced the results via increasing risk awareness.<sup>8,23,24</sup> Since a large-scale earthquake has never occurred in the Korean peninsula, risk awareness for earthquakes was at an all-time low, as earthquakes were generally considered to be a problem faced by neighboring Japan; however, tremors from the recent earthquake were felt by people far away from the center, leading to a higher risk awareness. Social disasters with the highest perceived risk were infectious diseases such as MERS and AI (46.2%). These findings may reflect the influence of the MERS epidemic in 2015, where the number of deaths in Korea was the highest in all regions outside of the Middle East.

Although only 4.9% of respondents had experienced damage from disasters, 82% of the participants reported receiving education on how to respond to disasters. These trends indicate a downtrend in the experience of disasters compared with existing literature,<sup>13,14</sup> but a rapid increase in the amount of disaster-related education. Specifically, 35.1%<sup>25</sup> and 35.6%<sup>14</sup> of participants in other studies responded that they had experience with disaster response education. The results also support past findings that the risk awareness of participants who have indirectly experienced disasters through mass media exposure is growing.

The risk awareness of natural disasters (1-10) averaged 4.89, and the risk awareness of social disasters (1-10) averaged 6.41. These results suggest that the perception of risk from social disasters was higher. While the risk of natural disasters is significant, people cannot do much about them; in contrast, the widespread damage from social disasters such as MERS appears to have influenced a higher risk awareness for these types of disasters.

Analysis revealed that female students reported significantly higher stress, anxiety, and depression compared with male students. Existing studies report that women tend to be more vulnerable to mental health issues from exposure to disasters compared with men.

Lee et al<sup>12</sup> examined the psychological influence of indirect exposure to trauma through news on disasters and showed that women had longer exposure to news on disaster events and a higher magnitude of shock from such events. Existing studies indicate that women are more prone to negative influences of disasters,<sup>26</sup> with prevalence rates of PTSD being two times higher than the rates of men. These sex differences remained after controlling for trauma types that were more common in women.<sup>27</sup> A 5-year tracking study on citizens of disaster-stricken areas<sup>28</sup> revealed that women had a higher rate of use of psychoactive drugs (ie, antianxiety drugs, antidepressants, sleeping pills) compared with men. However, female students tended to have higher levels of psychosocial stress and anxiety compared with male students.<sup>29</sup> In the current study, stress, anxiety, and depression of participants could have been influenced by factors other than those relating to disasters.

The regression results suggest that a higher perception of risk of natural disasters is associated with higher reporting of depression symptoms. The results also suggest that a higher perception of risk of social disasters leads to reporting of higher anxiety and depression symptoms. In contrast, a higher understanding of response strategies to disasters leads to reduced reporting of anxiety and depression. Having access to higher amounts of disaster-related information leads to reporting of lower anxiety symptoms. Although a direct comparison is difficult, the study results are in line with those of an existing study in which participants who were provided with disaster-related information or education had higher levels of disaster preparedness.<sup>13</sup> However, individuals with longer exposure to news on disaster-related events reported more stress symptoms.<sup>8,24</sup> This finding appears to be related to emotional shock resulting from exposure to serious disaster scenes on the news. Thus, it is important to provide accurate information on disaster events; however, rather than describing events, which increases anxiety, media should instead focus on providing information on prevention and practical response strategies.

It is difficult to study issues of psychological health that occur after disasters, as such studies cannot be planned or perfectly controlled. Possibly due to these difficulties, there is a lack of Korean cohort studies on psychological health issues induced by disasters. While the psychological health issues of victims directly impacted by disasters are of importance, disasters also tend to influence the regional community, and overcoming them is closely related to the resilience of the entire regional community.<sup>30</sup>

In order to recover from trauma caused by disasters, it is necessary to take into account the effect of and change in socio-cultural environment elements of the community, to which individuals belong, in addition to existing psychotherapeutic approach.<sup>31</sup> Therefore, it is important to actively engage in research for direct and indirect victims of disasters in the regional community. Existing trauma-related studies have repeatedly shown a trend of mushrooming after the occurrence of a certain event and disappearing afterwards.<sup>32</sup> However, in the future, the role of a continuous risk manager will be necessary to stand alongside individuals who have experienced trauma and the regional community they belong to

during the recovery process altogether and to provide appropriate interventions. As the main agent of community care, mental health nurses may contribute to improving disaster preparedness competencies and community disaster resilience.

This study is not without limitations. First, although the study included college students with a diverse range of majors, it did not include a national sample. Instead, the current study used convenience sampling, and this limits the generalizability of results. Second, because this study was cross-sectional, it could help in understanding the relationship between exposure to indirect trauma and stress, anxiety, and depression, but causal inferences could not be made. Based on these limitations, the following is proposed. As disasters occur frequently and the effects are prolonged, it is necessary to follow-up not only with individuals but also with their society changes, to identify the effects of trauma caused by disasters. However, in tracing the effects of trauma caused by disasters and the process of recovery, individual researcher's contribution is important, but it is also important to have a social/national tracking system and to have practical support for its maintenance. While existing disaster-related studies have focused on the symptoms and recovery experienced directly by victims, future studies should focus not only on trauma recovery at an individual's level but also on the recovery of individual and the entire regional community, as well as on the enhancement of resilience. Despite some limitations, this study identified the influence of the level of awareness and coping of college students regarding disasters that are becoming common in Korea and worldwide. This could be used as basic data for developing educational and safety management systems for disaster response.

#### 4.1 | Implications for nursing practice

As the frequency of natural and social disasters has increased, many college students feel anxious, even from indirect exposure to disasters. To date, coping methods are largely directed toward providing financial and social aid to those who have actually experienced disasters. Furthermore, mental health issues caused by indirect exposure to disasters do not draw much attention unless victims are directly affected by these disasters.<sup>7</sup> However, with the advancement of social media and social networking sites in today's society, it is easy to share disaster-related information such as its severity and degree of damage in real time, even if people do not experience these disasters directly. As indirect exposure to disasters and the amount of information increases, the possibility of experiencing stress, anxiety, and depression also increases.<sup>3</sup> Therefore, it is extremely important to recognize the seriousness of various mental health problems that can occur due to indirect exposure to disasters, as well as to establish and apply a supportive nursing education or intervention program to cope with them. Moreover, it is important to address these issues at both the individual and community levels, because mental health is important at both levels. Universities are the center of education and health for college students, who are at the end of adolescence

and the beginning of adulthood. Hence, special efforts should be made to maintain the students' physical and mental health. Disasters are hard to predict, and cannot be avoided intentionally. However, because disasters can happen to anyone, anytime, and anywhere, people feel a great sense of shock and helplessness, even when they do not directly experience disasters. Universities should plan educational programs for disaster preparedness and psychological interventions through mental health nurses, and they should create an environment where mental health nurses can actively implement these programs on campus.

Recently, universities are aggressively developing simulation education methods assuming disasters for nursing education. Through these processes, students will be able to enhance their disaster management competencies. It is essential to educate students on how to cope with disaster-related mental health problems, and encourage them to attend mental health programs to prepare them for possible future disasters. Additionally, students with severe stress, anxiety, and depression due to indirect exposure to disasters should be identified through consultation with mental health nurses and referred to external professional counseling centers or mental health clinics. In addition, mental health nurses in universities need to sensitively respond to mild mental health problems caused by indirect exposure to disasters, and they should develop and implement education, counseling, and intervention programs to help them recover. To do so, it is necessary for nursing professors and university researchers to collaborate and carry out research related to the development and implementations of various intervention programs to promote mental health.

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#### CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

#### AUTHOR CONTRIBUTIONS

E,L designed the study, reviewed literature, performed the statistical analyses, and described study methods and results. H,L was involved in the design of the study, reviewed literature, and wrote the manuscript. All authors read and approved the final manuscript.

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## REFERENCES

1. Ministry of Interior and Safety. (2018). National Disaster Management Portal: Statistics and Downloads. Retrieved [http://www.safe-korea.go.kr/idsiSFK/165/menuMap.do?w2xPath=/idsiSFK/wq/sfk/cs/csc/bbs\\_conf.xml&bbs\\_no=28](http://www.safe-korea.go.kr/idsiSFK/165/menuMap.do?w2xPath=/idsiSFK/wq/sfk/cs/csc/bbs_conf.xml&bbs_no=28)
2. Fullerton CS, Ursano RJ, Wang L. Acute stress disorder, posttraumatic stress disorder, and depression in disaster or rescue workers. *Am J Psychiatry*. 2004;161(8):1370-1376. <https://doi.org/10.1176/appi.ajp.161.8.1370>
3. Neria Y, Sullivan GM. Understanding the mental health effects of indirect exposure to mass trauma through the media. *JAMA*. 2011;306(12):1374-1375. <https://doi.org/10.1001/jama.2011.1358>
4. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*. Arlington, VA: American Psychiatric Publishing; 2013. <https://doi.org/10.1176/appi.books.9780890425596>
5. Breslau N. The epidemiology of trauma, PTSD, and other posttrauma disorders. *Trauma Violence Abuse*. 2009;10(3):198-210. <https://doi.org/10.1177/1524838009334448>
6. Bernstein KT, Ahern J, Tracy M, Boscarino JA, Vlahov D, Galea S. Television watching and the risk of incident probable posttraumatic stress disorder: a prospective evaluation. *J Nerv Ment Dis*. 2007;195(1):41-47. <https://doi.org/10.1097/01.nmd.0000244784.36745.a510.1097/01.nmd.0000244784.36745.a5>
7. Silver RC, Holman EA, Andersen JP, Poulin M, McIntosh DN, Gil-Rivas V. Mental-and physical-health effects of acute exposure to media images of the September 11, 2001 attacks and the Iraq War. *Psychol Sci*. 2013;24(9):1623-1634. <https://doi.org/10.1177/0956797612460406>
8. North CS, Pfefferbaum B. Mental health response to community disasters: a systematic review. *JAMA*. 2013;310(5):507-518. <https://doi.org/10.1001/jama.2013.107799>
9. Joo JY, Huh S, Yoon YA, Chae JH. Current trends and future tasks of cohort study for disaster victims. *J Korean Neuropsychiatr Assoc*. 2016;5(3):168-175. <https://doi.org/10.4306/jknpa.2016.55.3.168>
10. Kim YJ, Park NH, Lee JS, et al. An analysis of disaster recognition in medical personnel and 119 rescuers after Daegu subway disaster. *J Korea Soc Emerg Med*. 2006;17(5):395-405.
11. Shin SM, Park HK. Notes on integrated disaster management for resilient response to disaster. *Korea Soc of Dis Sec*. 2015;8(2):11-20.
12. Lee HP, Choi YK, Lee JH, Lee HS. The psychological consequences of indirect trauma exposure through the news on the Sewol ferry disaster. *Korea J of Cult Soc Iss*. 2016;22(3):411-430. <https://doi.org/10.20406/kjcs.2016.08.22.3.411>
13. Park JY, Woo CH, Yoo JY. Experience, awareness and preparedness of disaster among nursing college students. *Korea Rev Crisis Emer Man*. 2015;11(11):19-35. <https://doi.org/10.14251/krcem.2015.11.11.19>
14. Kang KH, Uhm DC, Nam ES. A study on disaster experience and preparedness of university students. *J Korean Acad Nurs*. 2012;18(3):424-435. <https://doi.org/10.5977/jkasne.2012.18.3.424>
15. Kim CE, Shim JC. A survey on the university student recognition of safety education. *J Res Ins of IndusTechno*. 1999;18(18):387-398.
16. Kim SY. Safety awareness and safety practice behavior of college students. *J of Digital Convergence*. 2015;13(2):279-289. <https://doi.org/10.14400/JDC.2015.13.2.279>
17. Cohen S, Kamarck T, Mermelstein R. Global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-396. <https://doi.org/10.2307/2136404>
18. Park JH, Seo YS. Validation of the perceived stress scale (PSS) on samples of Korean university students. *Kor J Psychol: Gen*. 2010;29(3):611-629.
19. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;56(6):893-897. <https://doi.org/10.1037/0022-006X.56.6.893>
20. Kwon SM, Oei TPS. Differential causal roles of dysfunctional attitudes and automatic thoughts in depression. *Cognit Ther Res*. 1992;16(3):309-328. <https://doi.org/10.1007/BF01183284>
21. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1(3):385-401. <https://doi.org/10.1177/014662167700100306>
22. Chon KK, Lee MK. Preliminary development of Korean version of CES-D. *Korean J of Clin Psychol*. 1992;11(1):65-76.
23. Ahern J, Galea S, Resnick H, Vlahov D. Television images and probable posttraumatic stress disorder after September 11: the role of background characteristics, event exposures, and prevent panic. *J Nerv Ment Dis*. 2004;192(3):217-226. <https://doi.org/10.1097/01.nmd.0000116465.99830.ca>
24. Lee YR, Han SJ, Cho CM. Disaster experience, perception and perceived stress of nursing students. *Korea J Stress Res*. 2016;24(4):237-242 <https://doi.org/10.17547/kjsr.2016.24.4.237>
25. Noh JY (2011). Nurse's perception and core competencies on disaster nursing [Unpublished master's thesis]. Seoul: Yonsei University.
26. Wayment HA. It could have been me: vicarious victims and disaster-focused distress. *Pers Soc Psychol Bull*. 2004;30(4):515-528. <https://doi.org/10.1177/0146167203261892>
27. Tolin DF, Foa EB. Sex differences in trauma and posttraumatic stress disorder: a quantitative review of 25 years of research. *Psychol Bull*. 2006;132(6):959-992. <https://doi.org/10.1037/0033-2909.132.6.959>
28. Diène E, Geoffroy-Perez B, Cohidon C, et al. Psychotropic drug use in a cohort of workers 4 years after an industrial disaster in France. *J Trauma Stress*. 2014;27(4):430-437. <https://doi.org/10.1002/jts.21940>
29. Lee MJ, Cho YC. Self-perceived psycho social stress, anxiety and depression symptoms, and its related factors among college students. *J Korea Acad-Industr Coop Soc*. 2013;14(6):2828-2838. <https://doi.org/10.5762/KAIS.2013.14.6.2828>
30. Yoon DK, Kang JE, Brody SD. A measurement of community disaster resilience in Korea. *J Environ Plann Man*. 2016;59(3):436-460. <https://doi.org/10.1080/09640568.2015.1016142>
31. Wind TR, Komproe. IH. The mechanisms that associate community social capital with post-disaster mental health: a multilevel model. *Soc Sci Med*. 2012;75(9):1715-1720. <https://doi.org/10.1016/j.socscimed.2012.06.032>
32. Joo HS, Lee SS, Ahn HN. A topic modeling analysis of research trends on trauma in Korea. *Crisisonomy*. 2017;13(10):103-123. <https://doi.org/10.14251/crisisonomy.2017.13.10.103>

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