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Research Article

The Influence of Disaster Safety Awareness on the Safety Competency of College Students

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Abstract: With various social disasters such as fire and COVID-19 occurring recently along with natural disasters, the problem of young people's insensitivity to safety has emerged. It is important to understand what causes the lack of disaster safety awareness among college students, and to understand how this lack of disaster safety awareness affects safety competency. 2,236 college students' questionnaires on self-reported disaster safety awareness and competency were collected. Data were statistically analyzed with descriptive statistics, independent t-test, factor analysis and multiple regression analysis using the SPSS 25.0 program. Greater personal (basic) awareness (β = .53), social awareness (β = .44), and cultural awareness (β = .38) of disaster safety were associated with greater safety competency. Disaster safety awareness explained 61.7% of their safety competency. Efforts are required to promote individual and social competency against disasters by running programs to continuously raise disaster safety awareness among college students.

Keywords: College student, disaster, safety awareness, safety competency

1. Introduction

Recently, various social disasters such as fire and COVID-19 have occurred around the world along with natural disasters. Although the importance of social safety is well known, the results of a survey by the **Ministry of the Interior and Safety (2019)** showed that the public's disaster safety awareness has decreased over the past year, and the public's awareness of social safety guidelines is low. In addition, Young people in 10s and 20s are reported to have a lower safety awareness than middle-aged people **(Lim, 2016)**, which requires intensive attention. Disaster Safety Awareness is the unpredictable pandemics, acts of terrorism, main motivator to prepare community citizens for disaster situations such as chemical exposure. **(Kruger et al., 2020)** In this case, Awareness of disaster safety is an important factor in responding to a disaster. **(Lee & Min, 2015; Jeong et al., 2010)** Also, the level of disaster safety management can change depending on the level of awareness, which can be directly linked to disaster preparedness capabilities. Recent studies recommend using appropriate tools to clearly measure safety awareness. **(Bandecchi et al., 2019)** This studies are also reporting the effects of running certain programs to increase safety awareness. **(Son & Im, 2016; Shariati & Guerette, 2019)**

"Competencies" refers to potential characteristics of individuals who produce effective and excellent performance, **(Klemp, 1980)** or to internal characteristics of individuals who contribute to effective and excellent performance that are subject to compliance under certain circumstances or duties. **(Spencer & Spencer, 1993; Hoffmann, 1999)** Disaster safety competency is also required as an element to produce desirable results in disaster safety management, and disaster safety competency is a key factor in the process of disaster prevention, preparedness, response and recovery. So far, a prior research has presented strategies for analyzing and strengthening disaster safety competency in many aspects of the system operated by the state or local governments. **(Yoo & Oh, 2013; Malla et al., 2020)** A recent report on disaster safety competency in the community reported the status of women who are subject to greater damage in the event of a disaster. **(Kim, 2016)** However, the vulnerability of disaster safety awareness is emphasized, and there is a lack of research on college students exposed to the concentration of infrastructure due to frequent use of multiple facilities and the risk of chemical leakage in laboratories. There is also a need to identify detailed aspects of the perception of disaster safety and how it affects actual disaster safety competency because of the sparse nature of the studies attempted to confirm the direct relevance of the awareness to disaster safety.

Against this backdrop, this study sought to understand the causes of the lack of safety awareness among college students and how this lack of safety awareness affects their safety competency. It also aims to provide a direction for future changes in safety awareness. This study was structured to identify the association of (a) personal (basic) awareness of disaster safety (knowledge, alertness, personal interest, procedures, prevention, etc.), (b) social awareness (safety-focused, safety-first, safety-avoidance), and (c) cultural awareness (manager interest, information

provision, improvement, access to information, communication) with (d) disaster safety competency (understanding, handling capacity, information capability, ability to take action, reporting capacity).

The following hypotheses were tested:

Hypothesis 1: Personal awareness is positively associated with disaster safety competency.

Hypothesis 2: Social awareness is positively associated with disaster safety competency.

Hypothesis 3: Cultural awareness is positively associated with disaster safety competency.

2. Method

2.1. Participants

This study utilized a correlational survey design. College students who lived in or attended schools in Daejeon and South Chung-cheong were recruited. The inclusion criteria were college students who understood the study purpose and provided informed consent to participate. Participation was limited to college students because they receive various disaster safety education programs in schools (in dormitories, laboratories, etc.), unlike others in the general population. So, one may expect their perceptions to change through education.

2.2. Measures

A structured questionnaire of 22 items was used, including 4 items on general characteristics (gender, age, major department, experience of disaster damage). Disaster safety awareness is measured using modified and supplemented tools which were developed by **Kim (2015)** to suit the situation of college students. The tool is a five-point Likert scale of 13 items, and the items consist of personal (basic) awareness (5 items), social awareness (3 items), cultural awareness (5 items). The higher measured score indicates a higher level of disaster safety awareness. The reliability of the tool in Kim's study was Cronbach's α .92.

Disaster safety competency is measured using modified and supplemented tools which were developed by **Park & Kim (2014)** to suit the situation of college students. The tool is a five-point Likert scale of 5 items. The higher measured score indicates a higher level of disaster safety competency. At the time of tool development **(Park & Kim, 2014)**, the reliability of the tool was Cronbach's α .80.

The questionnaire used in this study was based on questions used in a prior study, and the items were investigated using factor analysis (Table 1). Each factor selected had an eigenvalue of 1.0 or higher, a common value of .5 or higher, and a reliability of .6 or higher.

Individual, social, and cultural awareness, which are independent variables, were all found to be statistically significant ($p < .05$). In addition, Cronbach's alpha was used to quantify the reliability of each variable, and those reliabilities were found to be adequate, averaging .85. In addition, the dependent variable, disaster safety competency, was also found to be statistically significant ($p < .05$), and its reliability was .95.

Table.1. Validity and reliability of the measured variable (n = 2,236)

Variable				**Communality**	**Factor loading**	**Cronbach's α**
Safety awareness	1-1	Background knowledge	Personal (basic) awareness	.79	.83	.94
	1-2	Consciousness		.83	.86	
	1-3	Concern		.83	.86	
	1-4	Process		.84	.87	
	1-5	Prevention		.78	.82	
	2-1	Safety-oriented	Social awareness	.66	.75	.73
	2-2	Safety-first		.63	.72	
	2-3	Safe evacuation		.66	.75	
	3-1	Manager interest	Cultural awareness	.62	.63	.89
	3-2	Provide information		.77	.82	
	3-3	Improvement		.79	.83	

	3-4	Information access		.76	.83	
	3-5	Communication		.64	.77	
Kaiser-Meyer-Olkin .92, p < .001						
Eigenvalue 6.70						
Safety competency	4-1	Comprehension competency		.80	.90	.95
	4-2	Process competency		.84	.92	
	4-3	Information competency		.84	.91	
	4-4	Measure competency		.84	.92	
	4-5	Report competency		.82	.90	
Kaiser-Meyer-Olkin .90, p < .001						
Eigenvalue 4.14						

2.3. Procedure

Prior to carrying out this study, a preliminary survey was conducted on five university students to communicate the contents of the items and to confirm the possibility of the survey, and there were no problematic questions. The data collection for the research was conducted for one month from October 14 to November 11, 2019. A questionnaire containing no personal identification information was used. The incomplete 220 of the total 2,456 questionnaires were excluded from the analysis. A total of 2,236 questionnaires were analyzed.

2.4. Data analyses

The validity and reliability of the tools used in the study were analyzed with factor analysis and the Cronbach's α. General characteristics, disaster safety awareness, and safety competency were analyzed using frequency, percentage, mean, and standard deviation. The differences in disaster safety competency according to general characteristics were analyzed using independent t-tests. Finally, the influence of disaster safety awareness on safety competency was analyzed using a multiple regression analysis. SPSS 25.0 (SPSS, Inc, Chicago, IL, USA) program was used for all data analyses.

3. Results

3.1. College students' characteristics and safety competency

The general characteristics of participating college students were identified as gender, age, major department, and experience of disaster damage. The major areas were divided into medical and non-medical departments. The medical departments included the departments of medicine, nursing, emergency rescue, physical therapy, rehabilitation, occupational therapy, etc. Among the general characteristics, male students' disaster safety competencies were higher than that of female students, so a significant difference was confirmed (t = 11.68, p < .001) (Table 2).

Table.2. College students' characteristics and safety competency (n = 2,236)

Characteristics	**Categories**	**n (%)**	**Safety competency**	
			Mean ± SD	**t (*p*)**
Gender	Male	779 (34.8)	18.40 ± 4.12	11.68 (<.001)
	Female	1457 (65.2)	16.33 ± 3.71	
Age (years)	<25	2062 (92.2)	17.03 ± 3.98	-0.64 (.519)
	≥25	174 (7.8)	17.24 ± 4.00	
Major department	Medical	754 (33.7)	16.90 ± 3.88	-1.24 (.215)
	None medical	1482 (66.3)	17.12 ± 4.04	
Experience of disaster damage	Yes	414 (18.5)	17.09 ± 4.16	0.20 (.840)
	No	1822 (81.5)	17.04 ± 3.94	

3.2. Influence of disaster safety awareness on the safety competency

Regression analysis was conducted to quantify the association of disaster safety awareness with safety competency. The result of the analysis shows that Durbin-Watson statistic (1.936) is not self-contained. Adjusted R2, which indicates the explanatory power of the variable, was 0.617 (61.7% explanatory power) and the F value indicating the fit of the model was 1198.53 ($p < .001$). This indicates that there was no problem with the model. The regression analysis also showed that personal awareness ($\beta = .53$, $p < .001$), social awareness ($\beta = .44$, $p < .001$), and cultural awareness ($\beta = .38$, $p < .001$) were significantly associated with disaster safety competency (Table 3). Therefore, hypotheses 1, 2, and 3 were all supported.

Table.3. Influence of disaster safety awareness on the safety competency (n = 2,236)

Safety awareness	Safety competency				
	β	t-value	95% CI of B		p
			upper	lower	
Personal awareness	.53	4.63	.51	.56	< .001
Social awareness	.44	3.32	.41	.46	< .001
Cultural awareness	.38	2.90	.35	.40	< .001

Durbin-Watson statistic = 1.936, Adjusted $R^2 = 0.617$, $F = 1198.53$, $p < .001$

4. Discussion

This study aimed to identify the relationship of disaster safety awareness (personal, social, cultural) and the safety competency among college students. This study revealed that all sub-factors of disaster safety awareness improve safety competency. This result is meaningful in that consideration of disaster safety awareness is needed on the basis of the development of strategies to enhance disaster safety competency of college students.

Although new technologies are being developed and applied to create a safe environment within the community, **(Cha, 2018)** unforeseen disaster situations are constantly occurring in various form. In order to respond well to and overcome a disaster situation, personal preparation is required along with institutional efforts through public-private partnerships, **(Yoo, 2016)** and the development of disaster safety competency is a key factor. **Sosmiarti, Karimi, Noer & Taifur (2018)** reported that the application of personal strategies in various ways in an earthquake disaster situation showed rapid livelihood recovery, and suggested preparing personal capacity for disaster.

In this study, it was confirmed that the disaster safety competency of college students was higher in the case of male students than that of female students. In the report on the current status of women's disaster safety competency, women have high vulnerability and psychological anxiety to disasters, and low confidence in their ability to respond, arguing that it is necessary to develop appropriate policies for women. **(Kim, 2016)** In particular, in addition to gender differences, the proportion of male students in military departments and defense police administration departments, which are expected to be highly sensitive to disasters, is thought to have an impact on the level of disaster safety competency.

In the results of the regression analysis of this study, it was confirmed that all sub-factors of college students' awareness of disaster safety were factors that had a positive effect on their disaster safety competency. These results are consistent with the reports of previous studies **(Song & Kim, 2020)** that reported that nursing students' disaster nursing performance ability had a positive correlation with a positive disaster-related attitude and high disaster safety awareness. In the study on safety awareness of researchers working at research institutes in Italy, prepared by **Papadopoli, Nobile, Trovato, Pileggi & Pavia (2020)**, if there is a lot of experience in safety education, the level of knowledge about safety is high, and if the level of awareness about risk situations is high, correct practice. As a result, raising the level of disaster safety awareness is related to safety competence, and safety competence is linked to practice.

In addition, previous study **(Kim et al., 2020)** suggested the positive effect of disaster safety awareness on subjective well-being. In this regard, the effect of operating a program to raise disaster safety awareness, which is a fundamental element that creates a positive effect in response to and recovery from disasters, has been reported **(Hong & Jeong, 2019)**. This study supports the hypothesis that greater disaster safety awareness is positively associated with practical competency. What can be confirmed through this is that it is very important to run a program that enhances disaster awareness through continuous education regarding disasters. Although we are still experiencing the difficult disaster situation caused by COVID-19, the awareness of disaster safety is nonetheless insufficient, especially among college students. There is a high risk of accidents being caused by this lack of

awareness. Therefore, various national and social efforts are required to improve disaster safety education and awareness among college students. These efforts will strengthen individual and social competency against high-risk disasters.

The results of this study are meaningful in demonstrating the importance of disaster safety awareness on safety competency. However, there are limitations to the generalization of the results, as the research has been conducted in a specific area and has not been extensively investigated for various variables that may affect disaster safety competency.

Based on the results of this study, a future study proposes to expand the target area nationwide to establish a sample, and to add influential variables to identify the factors affecting the disaster safety competency. In addition, a follow-up study is needed to verify the effectiveness of disaster safety competency and practice by developing and operating programs that can reinforce disaster safety awareness according to the sub-factors identified in this study.

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