Factors Influencing the Disaster-Incident-Related Shock Experienced by Korean Nursing Students

Running Head: Disasters, Nursing student

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Abstract: The frequency of earthquakes in South Korea is increasing. This study aimed to examine and identify the factors influencing the degree of disaster-incident-related shock among Korean nursing students with the disaster experience. The study sample consisted of 153 nursing students who have been living around Phohang-si in Gyeongsang-do, South Korea, and who having the experience of disaster-incident-related shock. Measures were Impact of Event Scale, Perceived health status scale, Psychological Well-Being Scale, and Coping Strategy Indicator in Korean version. The data collection period was from October to December, 2018. The factor that was found to have the most influence on disaster-incident-related shock among Korean nursing students was the perceived health status ($\beta = 0.48$), followed by gender ($\beta = -0.28$), coping skill ($\beta = 0.18$), psychological well-being ($\beta = 0.14$), need for disaster education ($\beta = 0.12$), and major satisfaction ($\beta = -0.12$). This study provides preliminary evidence that perceived health status is a major and primary predictor of disaster-incident-related shock among Korean nursing students, next followed by coping skill, and psychological well-being. The findings can be reflected in the pertinent curriculum by actively considering these influence factors in designing nursing education interventions for disaster-incident-related shock in the Korean nursing students.

Keywords: disasters; health status; coping skill; nursing student

1. Introduction

South Korea is situated on the eastern edge of the Eurasian Plate, which is widely recognized as an earthquake safety zone [1]. The 5.8-sized Gyeongju earthquake in September 2016, however, led to a shift in the perception that South Korea is a safe zone for earthquakes, and the magnitude 5.4 earthquake that occurred in the Red Sea region, 6 km north of Pohang, in November 2017 raised the people's awareness of the damage that can be caused by earthquakes [2,3]. Today, South Korea is constantly experiencing new types of natural disasters and accidents, and many regions in the country are hit by such disasters and experience the damage caused by these [1].

Earthquakes are natural phenomena that can cause severe damage to a country in terms of people's lives and property, including related damages due to fires, collapses, explosions, traffic accidents, and environmental pollution [1]. The frequency of earthquakes in South Korea is increasing, along with extreme weather and global warming, due to the country's geographical condition, particularly the fact that it is located at the intersection of the continental and marine climates [4]. The occurrence of an earthquake can pose enormous obstacles to people's perceived health status, psychological well-being, individual coping skills, and quality of life [5-7]. Socially, it can cause many casualties and property damage, which can negatively affect people's living environment [4]. In particular, shocks like those from disasters like earthquakes have a very negative impact on people's physical, psychological, and social health, and can cause mental pain that can lead to serious adverse effects in terms of adjusting to reality [5,8].

There has been an active debate in South Korea of late about the need for an advanced disaster management system in preparation for earthquakes [1,4]. There has also been a social demand for the establishment of such a system [1]. In this regard, the Korean nursing academic society established the Korean Academy of Disaster Nursing in 2010, and some

nursing colleges operated it as an emergency disaster nursing course [9,10]. Most of the disaster nursing courses being offered by Korean nursing colleges, however, are not required courses for the major but are merely elective courses [11]. Thus, the systematic disaster nursing education programs for nursing students are still insufficient [11]. The need for such is partly addressed in the emergency, community, and mental health nursing curricula, but a more specific and efficient disaster preparedness curriculum is urgently needed for the disaster nursing education program for the nursing students in South Korea [7,10].

The recently studied prior literature on nursing students in relation to disasters included a study on the degree of disaster nursing awareness of nursing students; disaster nursing competence and self-resilience; disaster preparedness; core performance and educational needs of disaster nursing; and disaster experience, disaster awareness, and stress related to perceived disaster [10,12-14]. The disaster-related education given to nursing students, however, which nursing students consider necessary based on their experience, is very poor. Therefore, this study was conducted to investigate the degree of shock from a disaster incident and the variables related to disaster-incident-related shocks experienced by nursing students, and analyze the factors that influence disaster-incident-related shock. Furthermore, this study highlighted the necessity of nursing education and preparation for coping with disasters, and ultimately to come up with the basic data necessary for nursing students' disaster nursing education.

The purpose of this study was to examine and identify the factors influencing the degree of disaster-incident-related shock experienced by nursing students. The aims of the study were: (1) to identify the general characteristics of nursing student who have experienced disaster-incident-related shock; (2) to examine the degree of disaster-incident-related shock and factors related to it; (3) to examine the degrees of disaster-incident-related shock according to the general characteristics of the study participants; (4) to examine the correlations between

the degree of disaster-incident-related shock and the factors related to it; and (5) to determine the factors that influence the degree of disaster-incident-related shock.

2. Materials and Methods

2.1. Study Design

A cross-sectional descriptive design was employed.

2.2. Setting and Participants

Participants were a total of 153 nursing students who have been living around Phohang-si in Gyeongsang-do, South Korea. The area around Phohang-si, Gyeongsang-do, South Korea was where the earthquakes occurred. Participants were recruited by convenient sampling. The eligibility criteria included an age of 20 years or older attending to nursing school around Phohang-si area, having the experience of disaster-incident-related shock, an awareness of the purpose of this study, voluntary participation in the study, and having complete verbal communication ability in Korean. Exclusion criteria were nursing students who had no experience of disaster like earthquakes. Among 155 questionnaires, 153 (98.71%) were received back. The 153 questionnaires were accepted in the final dataset because all they were complete. Sample size adequacy ($N = 129$) using F test, G power 3.1.2 analysis software was estimated based on an alpha level 0.05, medium effect size 0.15, and power 0.95 [15]. Therefore, the sample size was adequate.

2.3. Data Collection

A nursing school in the area around Phohang-si, Gyeongsang-do, South Korea where the earthquakes occurred was visited for permission of this study. Researchers contacted to prospective study participants, and discussed with them the purpose of this study, as well as

the details of their participation and the questionnaire that would be used in data gathering. The questionnaires were given only to nursing students who sent their consent forms; then, the completed questionnaires were returned from the nursing students. The survey was a self-reporting questionnaire that was administered by the researchers. The average time to complete the survey was 15~20 minutes. The data collection period was from October to December, 2018.

2.3.1. Primary Outcome

Impact of Event Scale (IES) developed by Horowitz et al. [16] was revised and implemented to Korean version by Eun et al. [17]. This scale was used to determine the degree of disaster-incident-related shock of the participants. It consists of a total of 22 questions on the emotions, feelings, and actions that remind one of a disaster incident; the sleep disorders and social constraints that one developed due to a disaster incident; and one's physical reactions to a disaster incident. It was a 5 points Likert scale. The most likely score range would be 22-110, and the higher the respondent's score was, the higher was the corresponding degree of disaster-incident-related shock. The reliability of the scale used in this study was based on Cronbach's α .87.

2.3.2. Covariates

General characteristics of study participants consisted of a total of 6 items as followings gender, age, religion, need for disaster education, living together, and major satisfaction.

Perceived health status scale developed by Ware [18] and Speake et al. [19] was revised to Korean version by Cho [20]. This scale was utilized to quantify the degree of perceived health status of participants. It consists of three questions on the one's current health status, daily life disturbance, and health status compared to the other people in the same age group.

It was a 5 points Likert scale. The probable score range would be 3-15, and the higher the respondent's score was, the higher was the degree of perceived health status. The reliability was made possible through Cronbach's α .85.

Psychological Well-Being Scale (PWS) developed by Ryff and Keyes [21] was revised to Korean version by Kim and Kim [22]. This scale was used to measure the psychological well-being. It consists of autonomy, environmental control, personal growth, life purpose, positive interpersonal relationship, and self-acceptance. This scale consists of a total of 45 questions using a 5 points Likert scale. Possible scores are 45 to 225, and the higher the respondent's score was, the greater was the level of psychological well-being. The reliability of the scale was Cronbach's α .86.

Coping Strategy Indicator (CSI) developed by Amirkan [23] was revised to Korean version by Shin and Kim [24]. This scale was used to measure the degree of coping skill. This scale consists of the three sub-dimensions of seeking social support, problem-solving-centeredness, and avoidance-centeredness. This scale included a total of 33 questions using a 5 points Likert scale. Possible scores are 33 to 165, and the higher the respondent's score was, the higher was the level of coping skill. The reliability of the scale was based on Cronbach's α .98.

2.4. Statistical Analysis

The collected data were analyzed with the SPSS version 21.0 statistical software program. The general characteristics of the study participants and the levels of study variables were determined by descriptive statistics using frequency, percentage, mean, and standard deviation. The degrees of disaster-incident-related shock according to the general characteristics of the study participants were analyzed by t-test, F test, and post hoc test. Correlations among study variables related to disaster-incident-related shock were probed by

using the Pearson correlation coefficient. In the course of investigating the factors that influenced their levels of disaster-incident-related shock, multiple regression analysis was used.

2.5. Ethical Approval

In ethical consideration, the Institutional Review Board of a university in Gyeonggi-do, South Korea approved this study (IRB No. 1040656-201810-SB-01-05). Participants were briefed that their involvement in the study would be voluntary, and there was no penalty for not participating in this study, and they could withdraw their commitment at any time. They were also told that the information they would give would remain anonymous and confidential. The researchers then obtained completed written consent forms from the study participants.

3. Results

Table 1 shows the general characteristics of study participants. The most of gender was female (73.2%), and male was 26.8%. The average age of the participants was 23.33 years old, and the largest age group was those aged 23-25 years old (52.9%). In terms of need for disaster education, 52.9% of the participants responded 'Yes'. Most of the participants were living with family (71.2%), followed by living alone in dormitory (25.5%). As for the exercise, 51.7% of participants were exercising 1-2 days/a week. As for the major satisfaction, 51.6% of the participants were satisfied, and 41.8% of them were moderate. Also, most of the participants had morning stiffness (84.1%), and had other disease (79.6%).

In Table 2, mean score of disaster-incident-related shock was 74.26 (SD = 12.99), indicating a higher level of disaster-incident-related shock compared to median value 66 score. Their mean score in terms of perceived health status was 10.28 (SD = 2.09), showing a

slightly higher level of perceived health status compared to median value 9 score. The participants' mean score in terms of the psychological well-being was 111.71 (SD = 11.37), exhibiting a lower level of psychological well-being compared to median value 135 score. Mean score of the participants in terms of coping skill was 104.54 (SD = 24.95), demonstrating a higher level of coping skill compared to median value 99 score.

In degrees of disaster-incident-related shock according to the general characteristics of the study participants, there were significant differences by the gender (t = 3.341, $p < 0.001$), age (F = 2.117, $p = 0.001$), religion (t = 1.669, $p = 0.016$), and major satisfaction (F = 3.199, $p < 0.001$), Table 3.

In the correlations between the participants' disaster-incident-related shock and related factors, the analyses of the participants' perceived health status (r = -0.699, $p < 0.001$), psychological well-being (r = -0.357, $p < 0.001$), and coping skill (r = -0.469, $p < 0.001$) showed negative correlations, Table 4.

Table 5 depicts the results of multivariate regression presenting factors influencing disaster-incident-related shock. All the assumptions of regression analysis in this study coincided with the required assumptions of the regression equations as followings. There was no multicollinearity problems (Durbin-Watson value = 1.685; tolerance limit = 0.243 ~ 0.765; Variance Inflation Factor (VIF) = 1.108 ~ 1.665). All the study variables were established to be independent of one another (correlations among study variables: from -0.699 to 0.392). For the assumption of the linearity model, the normality of the error term and homoscedasticity were satisfactory.

Multiple-regression analyses of the participants' perceived health status, psychological well-being, and coping skill; of the general characteristics of the participants' gender, age, religion, need for disaster education, living together, and major satisfaction were conducted to identify the key factors behind the level of disaster-incident-related shock. The analyses

proved that the prediction model for the level of disaster-incident-related shock of Korean nursing students was significant (F = 24.46, p < 0.001). The value of the adjusted R^2 was 0.607, corresponding to the explanatory power amounting to 60.7%. The factor that was found to be most influential on the disaster-incident-related shock of Korean nursing students was the perceived health status (β = 0.48), followed by gender (β = -0.28), coping skill (β = 0.18), psychological well-being (β = 0.14), need for disaster education (β = 0.12), and major satisfaction (β = -0.12).

4. Discussion

In the present study, the disaster-incident-related shock experienced by the Korean nursing students was relatively higher than the median value. This is similar to the study results obtained by Ahn and Kim [4] and Woo et al. [25]. This seems to be because the perception that South Korea is a relatively safe zone for earthquakes has been strongly dominant from the past. It can be interpreted as the result of the tendency to perceive a disaster like an earthquake as a sight to behold, and of the mindset of safety insensitivity. As such, it is necessary to change not only the nursing students' but also all the other South Koreans' perception of disasters like earthquakes in the future. Furthermore, for prompt response to disasters like earthquakes, it is necessary to prepare an efficient disaster response education program and to make all the South Koreans undergo it.

The female students in this study showed a higher degree of disaster-incident-related shock than the male students. In the study of Ahn and Kim [4], the male students with military service experience had experienced some military training related to disasters like earthquakes; thus, it could be predicted that the degree of their disaster-incident-related shock was relatively low. Therefore, when operating a disaster nursing course particularly related to earthquakes, a concrete and systematic disaster education method particularly pertaining to

earthquakes should be designed and operated to strengthen the simulation training related to disasters [26,27], allowing the trainees to experience real disaster situations by using audiovisual materials, in addition to theoretical education, and enhancing the trainees' disaster coping skills [4,26].

In the present study, the lower the age of a nursing student is, the higher the degree of disaster-incident-related shock. In the study of Woo et al. [25], those in the lower grades did not take a course related to disasters, so it was more difficult to predict their disaster-incident-related shock. In real-life disasters like earthquakes, anyone can become a major and direct victim, regardless of age. Thus, prompt realization of the need for disaster nursing education is necessary so that preparations can be done for disaster incidents like earthquakes, and to foster disaster preparedness [28]. It is also urgent to provide an efficient disaster response curriculum through the operation of disaster nursing courses required for the lower grades and by establishing continuity among and linking all the existing disaster nursing education programs, such as those for individuals, schools, workplaces, and communities [25].

The correlations between disaster-incident-related shock and the study variables in this study showed that the higher the perceived health status, psychological well-being, and coping skills of a nursing student are, the lower the disaster-incident-related shock. The results support those of the studies of Schmidt et al. [29] and Su et al. [30] on medical students, which reported that psychological instability due to disaster-incident-related shock leads to a high stress level, which causes excessive tension and anxiety, making it difficult for one to efficiently cope with disasters like earthquakes. Therefore, efforts are needed to help nursing students form an active self-concept, and to reinforce their psychological disaster preparedness to enable them to positively respond to disaster incidents [28].

In the present study, the most important factor affecting the disaster-incident-related shock of nursing students was perceived health status, followed by gender, coping skills,

psychological well-being, the need for disaster education, and major satisfaction. These results are difficult to directly compare because there have been few studies on Korean nursing students who have experienced disasters like earthquakes. The results of this study, however, are similar to those of the study of Kim [13] on nursing students, which reported that when there is no disaster experience, the ability to cope with disasters decreases, and productive and integrative activities are important to reduce the degree of disaster-incident-related shock of nursing students, through the formation of various social and psychological relationships. In addition, the results of the present study support the finding of the study by Schmidt et al. [29] that disaster-like situations tend to make one less psychologically unstable, and the more emotionally stable one is, the lesser the tendency to experience stress when a disaster occurs, thereby leading to a relatively good coping ability. To reduce the degree of nursing students' disaster-incident-related shock, a disaster preparedness nursing education intervention plan can be formulated with focus on the psychological aspect, which can reduce one's anxiety or tension in an earthquake-related situation, and which can ultimately reduce one's stress, and it can be reflected on the curriculum. In addition, Haraoka et al. [28], Jose and Dufrane [27], and Lee et al. [11] mentioned the necessity of developing a systematic disaster education method to increase the disaster preparedness of nursing students. Thus, further research should be conducted in the future on the various predictors affecting disaster-incident-related shock, which can be based on efficient disaster nursing education programs for nursing students.

The results of this study can be used to develop a broader understanding of the disaster nursing competency of the Korean nursing students, for its improvement, and can be reflected in the pertinent curriculum by actively considering these influence factors in designing nursing education interventions for disaster-incident-related shock in the Korean nursing students. Furthermore, they can be used to develop professional and skills-based disaster

nursing programs, and to cultivate competent nurses with expertise in disaster nursing. For the Korean nursing students to complete an effective disaster-related nursing education program, it is necessary to develop a tool for measuring the disaster-related knowledge and practical disaster nursing competency of nursing students, and to conduct an experimental research to verify its effect by applying it.

Disasters like earthquakes can occur anywhere in South Korea. Thus, the paradigm of disasters like earthquakes should focus on strengthening the community's disaster resilience and preventive management, and disaster prevention education and research are necessary in the nursing colleges in South Korea.

Our study has several limitations. As there have been few studies related to the disaster-incident-related shock of the Korean nursing students, care must be exercised when expanding the results of this study to explain the disaster-incident-related shock experienced by all nursing students. In particular, as the study's nursing student sampling was limited to the region where an earthquake had occurred, the study results also have limitations in explaining the disaster-incident-related shock experienced by all nursing students. As such, it is necessary to repeat and expand the study in the future for the purpose of generalizing the factors affecting the disaster-incident-related shock experienced by nursing students.

5. Conclusions

Based on the results of this study, the factors affecting the degree of disaster-incident-related shock experienced by the Korean nursing students were found to be perceived health status, coping skills for disaster-incident-related shock, and psychological well-being. In other words, to reduce the degree of disaster-incident-related shock experienced by the Korean nursing students, it is necessary to improve their perceived health status and psychological well-being as well as to reinforce their way of positively coping with disaster-

incident-related shock. Furthermore, to develop a systematic curriculum for the improvement of the Korean nursing students' disaster coping ability and for the reduction of their disaster-incident-related shock, education contents for properly preparing the country's nursing students for earthquake-related situations should be included, and the grade level should be considered. Moreover, simulation training is important to provide nursing students with a specific disaster experience.

The results of this study are significant in that they can be used as basic data for the development of disaster nursing education intervention programs based on the disaster-incident-related shock experienced by the Korean nursing students.

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Table 1. General characteristics of the study participants.

Characteristics	Categories	n	%
Gender	Male	41	26.8
	Female	112	73.2
Age (year)	20~22	59	38.6
	23~25	81	52.9
	26~28	13	8.5
Religion	Yes	81	52.9
	No	72	47.1
Need for disaster education	Yes	81	52.9
	No	72	47.1
Living together	With family	109	71.2
	Living alone (Dormitory)	39	25.5
	Others	5	3.3
Major satisfaction	Satisfied	79	51.6
	Moderate	64	41.8
	Dissatisfied	10	6.6

Table 2. Levels of disaster-incident-related shock, perceived health status, psychological

well-being, and coping skill.

Variables	Range	Min	Max	Mean (SD)
Disaster-incident-related shock	22-110	40.00	110.00	74.26 (12.99)
Perceived health status	3-15	5.00	15.00	10.28 (2.09)
Psychological well-being	45-225	89.00	145.00	111.71 (11.37)
Coping skill	33-165	60.00	165.00	104.54 (24.95)

Table 3. Degrees of disaster-incident-related shock according to the general characteristics of

the study participants.

Characteristics	Mean	SD	t or F	*p*-Value Scheffe	
Gender					
Male	82.78	14.70	3.341	< 0.001	
Female	71.14	10.81			
Age (year)					
20~22	77.63	4.92 a	2.117	0.001	
23~25	77.59	13.55 b			a,b
26~28	68.38	5.89 c	>c		
Religion					
Yes	73.03	12.20	1.669	0.016	
No	75.63	13.79			
Need for disaster education					
Yes	72.66	14.25	0.863	0.708	
No	76.05	11.25			
Living together					
With family	74.13	13.13	1.080	0.366	
Living alone (Dormitory)	75.61	12.33			
Others	66.40	14.90			
Major satisfaction					
Satisfied	77.65	11.88 a	3.199	< 0.001	
Moderate	71.37	13.75 b			a>b
Dissatisfied	65.90	8.14 c	>c		

Table 4. Correlations between disaster-incident-related shock and the study variables.

Variables	Disaster-incident-related shock	Perceived health status	Psychological well-being	Coping skill
	r (*p*-Value)			
Disaster-incident-related shock	1			
Perceived health status	-0.699 (< 0.001)	1		
Psychological well-being	-0.357 (< 0.001)	0.241 (0.003)	1	
Coping skill	-0.469 (< 0.001)	0.392 (< 0.001)	0.240 (0.003)	1

Table 5. Factors influencing disaster-incident-related shock.

Variables	Model 1				
	B	S.E	β	t	*p*-Value
Gender	-23.18	3.23	-0.79	-7.17	< 0.001
Age (year)	-3.88	0.93	-0.44	-4.14	< 0.001
Religion	0.29	1.82	0.01	0.16	0.871
Need for disaster education	4.40	1.77	0.12	1.76	0.080
Living together	-0.50	1.63	-0.02	-0.30	0.761
Major satisfaction	-7.10	1.44	-0.33	-4.92	< 0.001
R2 = 0.361, Adjusted R2 = 0.330, F(*p*-Value) = 11.70 (< 0.001)					

Variables	Model 2				
	B	S.E	β	t	*p*-Value
Gender	-8.31	2.90	-0.28	-2.86	0.005
Age (year)	-0.97	0.78	-0.11	-1.24	0.217
Religion	2.00	1.42	0.07	1.40	0.163
Need for disaster education	3.15	1.36	0.12	2.31	0.022
Living together	1.04	1.28	0.04	0.81	0.416
Major satisfaction	-2.52	1.19	-0.12	-2.10	0.037
Perceived health status	3.00	0.39	0.48	7.63	< 0.001
Psychological well-being	0.16	0.06	0.14	2.73	0.007
Coping skill	0.09	0.03	0.18	3.17	0.002
R2 = 0.633, Adjusted R2 = 0.607, F(*p*-Value) = 24.46 (< 0.001)					