

# Influence of Social Responsibility and Pandemic Awareness of Nursing Students on Covid-19 Preventive Behaviors

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## Research Article

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# Abstract

## Background

Factors influencing coronavirus disease 2019 (COVID-19) preventive behavior require exploration to strengthen the response competencies of prospective healthcare professionals and reduce the pandemic's impact. This study aimed to identify the level of COVID-19 preventive behavior among Korean nursing students and to determine the influence of social responsibility and pandemic awareness to present educational strategies for reducing disaster impact.

## Methods

As a cross-sectional descriptive survey study using an online questionnaire, the participants were convenience sampled from one online community for nursing students and three nursing colleges located in Seoul, South Korea. Consequently, the data from 590 participants were analyzed by t-test, ANOVA, Pearson's correlation, and linear multiple regression using SPSS.

## Results

The factors influencing COVID-19 preventive behavior were identified to be social responsibility ( $B = .354$ ,  $p < 0.001$ ), pandemic awareness ( $B = .131$ ,  $p = .016$ ), impact of COVID-19 on daily life ( $B = .085$ ,  $p = .012$ ), and living in Daegu/Gyeong-buk area ( $B = .134$ ,  $p = .017$ ).

## Conclusion

Based on the findings that social responsibility and pandemic awareness are key predictors of COVID-19 preventive behavior, customized educational programs and additional studies are recommended for raising social responsibility and pandemic awareness among prospective healthcare professionals as a part of disaster response.

## Background

The first case of coronavirus disease 2019 (COVID-19) was reported in China on December 31, 2019[1]. On March 11, 2020, the World Health Organization (WHO) declared COVID-19 to be a global pandemic and as of November 2020, it continues to have a major impact worldwide[2]. During this global crisis, health care workers have been at risk of developing mental health problems due to the uncertainty of transmission, lack of definitive management protocols, and excessive workloads, with increased stress and anxiety levels[3]. Nevertheless, many nurses have expressed a sense of social responsibility in caring for suffering patients and fighting against COVID-19, while a higher level professional identity has been demonstrated by frontline nurses as compared to non-frontline nurses[4]. Nurses continue to advocate for

health equity for people at risk of spreading COVID-19 in terms of health communication, testing, and treatment as well as service accessibility for non-COVID-19 patients[5]. This requires nursing educators to take action to instill curricula and practices to prepare nursing students to take social responsibility.

As personal contact is the common route of COVID transmission, community control measures, including hand washing, mask wearing, and social distancing have been widely proposed[6]. Pandemics are global public health emergencies causing acute resource shortages. In such cases, preventive behaviors, including coughing etiquette, hand hygiene, and mask wearing, could be considered a mitigation measure offering a key disaster response strategy[7]. There have been numerous attempts to identify the disaster response competencies of nursing students, although studies identifying the competencies of prospective nurses under a pandemic situation have rarely been conducted. Previous studies did not consistently measure competencies, but mostly examined disaster planning, disaster command systems, decontamination, communication, and ethical issues as core competencies[8, 9].

Prospective healthcare professionals need to exhibit a high level of COVID-19 preventive behavior during a pandemic, similar to healthcare professionals. Due to their frequent contact with the hospital environment during their practical activities, they may directly or indirectly affect patients and subjects; they may also be assigned to an actual site of disaster as reserve personnel[10, 11]. Moreover, they are vulnerable to cluster infection due to being in spaces with high population density, such as schools[12]. Moreover, in contrast to the motivation for overall disaster participation, nurses' participation rate in pandemic response has been reported to be low[13, 14]. However, this motivation has not been fully explored, and several qualitative studies have simply suspected that this may be based on "social responsibility"[15–17]. Therefore, it is necessary to explore the competencies of nursing students, specifically in a pandemic.

In a pandemic situation, nursing students are prospective healthcare professionals who either are actual responders that implement mitigation measures or potential responders who will respond to future pandemics. Accordingly, this study identified the levels of social responsibility, pandemic awareness, and COVID-19 preventive behavior among nursing students, investigated the correlations among these variables, and identified the factors influencing COVID-19 preventive behavior with the objective of contributing to the establishment of educational strategies for prospective healthcare professionals.

## **Methods**

### **Design**

This was a cross-sectional descriptive survey study, conducted in an online setting in accordance with the principles of non-face-to-face and minimal contact in a pandemic situation. The survey used a structured questionnaire consisting of 62 items that asked about social responsibility, pandemic awareness, COVID-19 preventive behavior, effect of COVID-19 on daily life, COVID-19 stress, and general characteristics.

### **Participants**

Korean nursing students (freshmen to seniors) were convenience sampled. Data were collected from May 14 to 24, 2020. Based on 17 administrative districts for analysis by area of residence, the required sample size was calculated using the G-Power program with the parameters of a significance level of 0.05, statistical power of 0.95, and effect size of 0.25. The result indicated a minimum sample size of 476; considering a drop-out rate of 20%, the study recruited 595 participants. Ultimately, 591 participants took part. After excluding duplicate answers, data from 590 participants who answered all the questions were analyzed.

## **Measures**

### **Social Responsibility**

Social responsibility was measured using the tool originally developed by Conrad and Hedin (1985) and subsequently adapted to Korean by Kim's (1999) dissertation [18, 19]. This tool consisted of 27 items. Each item is graded on a 5-point Likert scale, from 1="not at all" to 5="very much." The score is calculated as a mean score, with a higher score indicating a higher level of social responsibility. The reliability of the tool at the time of development was Cronbach's alpha = .70 and reliability was assured in the present study with Cronbach's alpha = .88.

### **Pandemic Awareness**

Pandemic awareness was measured using a tool developed by Lee et al. (2016) and subsequently modified and supplemented by Han et al. (2018), which was specified for a pandemic situation by the researcher [20, 21]. This tool consisted of 17 items. Each item is graded on a 5-point Likert scale, from 1="not at all" and 5="very much." The score is calculated as a mean score, with a higher score indicating a higher level of pandemic awareness. The reliability of the tool at the time of development was Cronbach's alpha = .80 and reliability was assured in the present study with Cronbach's alpha = .73.

### **COVID-19 Preventive Behavior**

COVID-19 preventive behavior was measured using the tool originally developed by Kim and Park (2018) for measuring MERS preventive behavior [22], which was subsequently modified and supplemented by the researcher based on the COVID-19 prevention rules issued by the Korea Disease Control and prevention Agency (KDCA). This tool consisted of 10 items related to hand washing, coughing etiquette, and social distancing. Each item is graded on a 5-point Likert scale, from 1="never" to 5="always." The score is calculated as a mean score, with a higher score indicating greater practice of COVID-19 preventive behavior. The reliability of the tool at the time of development was Cronbach's alpha = .84 and reliability was assured in the present study with Cronbach's alpha = .84.

### **General Characteristics**

General characteristics of the participants included grade in school, volunteer service experience, and area of residence. In addition, the study captured COVID-19 related characteristics, including pandemic response education experience, disaster experience, COVID-19-related information source, COVID-19

impact on daily life, and psychosocial impact of COVID-19. The COVID-19 impact on daily life was measured by a single item asking “How much did COVID-19 impact your day-to-day life?” and the response was recorded on a 5-point Likert scale (1 = “Not at all”, 5= “Extremely”). Thus, the higher the score, the greater COVID-19’s impact on daily life. The psychosocial impact of COVID-19 was measured by asking “Which of the following did you experience during COVID-19?” adopted from the Pandemic Stress Index using an 18-item checklist[23]. The participants were allowed to choose multiple options and the number of options were summed up as an individual score; the higher the score the greater the psychosocial impact of COVID-19.

## **Procedure**

The present study was approved by the Institutional Review Board of “Y” Hospital in Korea (No. Y-2020-0057). After constructing the online questionnaire using a Google Forms, officials from each recruiting center were contacted to request their cooperation and a recruitment message was posted in one online community for nursing students and three nursing colleges located in Seoul, South Korea. The candidates gained access to the online questionnaire through the recruitment message link and QR code. Before participating in the survey, the participants were provided with an explanation that included basic ethical principles for participant protection, such as the confidentiality and the possibility of voluntary participation and withdrawal. After reading an explanation, those interested in participating were instructed to click on a ‘button’ in response that they read the consent information and agreed to participate, followed by viewing the survey questionnaire. Completed questionnaires were retrieved immediately to the researcher’s password protected computer. Upon completion of data collection, a small token of appreciation was sent via SMS.

## **Data Analysis**

The level of major variables such as social responsibility, pandemic awareness, COVID-19 impact, and the COVID-19 preventive behavior of nursing students was analyzed using descriptive statistics. Correlations between major variables were analyzed using Pearson’s correlation coefficients. COVID-19 preventive behavior according to general characteristics was analyzed by t-test or ANOVA. Factors influencing COVID-19 preventive behavior were analyzed using linear multiple regression.

## **Results**

### **COVID-19 Preventive Behavior by Participant Characteristics**

Among the participants, 43.1% were seniors and 68.8% intermittently participated in volunteer activities. Only 16.4% had pandemic education experience, while 22.7% had disaster experience, including experience with earthquakes and typhoons. The results also showed that 28.8% obtained COVID-19-related information through TV and 14.7% lived in Daegu/Gyeong-buk (Table 1). The Daegu/Gyeong-buk area was the region with the highest number of confirmed cases in South Korea during the data collection

period. The results also showed statistically significant differences in preventive behavior based on whether participants regularly participated in volunteer activities ( $F = 6.888, p < 0.01$ ) or lived in Daegu/Gyeong-buk ( $t = -2.278, p = .024$ ) (Table 1).

Table 1  
 COVID-19 preventive behaviors by participant characteristics (N = 590)

Characteristics	n(%)	Mean ± SD	t or F (post hoc test)	
Grade	Freshman	56(09.5)	4.46 ± 0.45	0.592
	Sophomore	131(22.2)	4.38 ± 0.55	
	Junior	149(25.3)	4.38 ± 0.53	
	Senior	254(43.1)	4.36 ± 0.52	
Voluntary service	Yes (Regular) <sup>a</sup>	85(14.4)	4.54 ± 0.47	6.888 <sup>***</sup> (a > b, a > c)
	Yes (intermittent) <sup>b</sup>	406(68.8)	4.37 ± 0.52	
	No <sup>c</sup>	99(16.8)	4.26 ± 0.54	
Pandemic education experience	Yes	97(16.4)	4.45 ± 0.53	1.110
	No	380(64.4)	4.36 ± 0.52	
	Don't know	112(19.0)	4.39 ± 0.53	
Disaster experience	Yes	133(22.7)	4.37 ± 0.52	-0.164
	No	453(77.3)	4.38 ± 0.52	
Information source	TV	170(28.8)	4.40 ± 4.40	10.051
	YouTube	23(03.9)	4.31 ± 4.31	
	SNS	142(24.1)	4.29 ± 4.29	
	Messenger	11(01.9)	4.25 ± 4.25	
	KDCA homepage	42(07.1)	4.52 ± 4.52	
	Public disaster alarm system	68(11.5)	4.50 ± 4.50	
	Internet Portal	128(21.7)	4.36 ± 4.36	
	Private Information website	6(01.0)	4.52 ± 4.52	
Residential areas	Daegu & Gyeong-buk	87(14.7)	4.48 ± 0.43	-2.278*
	Except Daegu & Gyeong-buk	503(85.3)	4.36 ± 0.54	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

The mean scores for social responsibility, pandemic awareness, COVID-19 impact on daily life, and COVID-19 preventive behavior were  $3.84 \pm 0.42$ ,  $3.88 \pm 0.42$ ,  $4.58 \pm 0.60$ , and  $4.38 \pm 0.52$  out of 5 possible points, respectively. The mean score of psychosocial impact of COVID-19 was  $4.93 \pm 2.40$  ranging from 0 ~ 14 (Table 2). With respect to the psychosocial impact of COVID-19, in the total episode that the participants experienced during COVID-19 (multiple responses accepted), the 10 most common episodes' percentage is shown in Fig. 1. The three most experienced episodes were "fear of getting COVID-19 (78.5%)," followed by "worrying about friends, family, partners, etc." (78.3%) and "fear of giving COVID-19 to someone else" (50.0%).

Table 2  
Level of Social responsibility, pandemic awareness, COVID-19 impact and COVID-19 preventive behaviors of nursing students (N = 590)

Variable (No. of items)	Mean $\pm$ SD	Observed Range
Social responsibility (27)	$3.84 \pm 0.42$	2.49 ~ 4.97
Pandemic awareness (17)	$3.88 \pm 0.42$	2.52 ~ 5.00
COVID-19 impact on daily life (1)	$4.58 \pm 0.60$	1 ~ 5
Psychosocial impact of COVID-19 (18)	$4.93 \pm 2.40$	0 ~ 14
COVID-19 preventive behaviors (10)	$4.38 \pm 0.52$	2.40 ~ 5.00

Relationships among Social Responsibility, Pandemic Awareness, COVID-19 Impact and COVID-19 Preventive Behavior of Nursing Students

Table 3  
Correlation between social responsibility, pandemic awareness, and COVID-19 preventive behaviors (N = 590)

Variable	Social responsibility	Pandemic awareness	COVID-19 impact on daily life	Psychosocial impact of COVID-19	COVID-19 preventive behaviors
Social responsibility	1				
Pandemic awareness	.478**	1			
COVID-19 impact on daily life	.208**	.167**	1		
Psychosocial impact of COVID-19	.038	.039	-.044	1	
COVID-19 preventive behaviors	.358**	.252**	.186**	-.039	1
** $p < .001$					

There were positive correlations among the variables social responsibility and COVID-19 preventive behavior ( $r = .358, p < .001$ ), pandemic awareness and COVID-19 preventive behavior ( $r = .252, p < .001$ ), and social responsibility and pandemic awareness ( $r = .478, p < .001$ ). Impact of COVID-19 on daily life showed a significantly positive relationship with COVID-19 preventive behavior ( $r = .186, p < .001$ ), indicating that higher levels of COVID-19 impact were related to higher levels of practice of COVID-19 preventive behaviors (Table 3). Additional analysis results showed that social responsibility was statistically significantly high among those participating in volunteer activities ( $t = 5.683, p < .001$ ) and those with disaster experience ( $t = 1.979, p = .048$ ).

## Factors Influencing COVID-19 Preventive Behavior

A linear multiple regression was performed with the input of effect of COVID-19 on daily life, volunteer activities, and area of residence, which were major variables that showed significant differences in the univariate analysis with COVID-19 preventive behaviors. In the multicollinearity test, the tolerance of the independent variables was higher than .1 (.593 ~ .991) and the variance inflation factor was lower than 10 (1.009 ~ 1.688), which confirmed that there was no problem with multicollinearity. The model was statistically significant, and the explanatory power was 16.4% ( $F = 19.108, p < .001$ ). The factors influencing COVID-19 preventive behavior were identified as social responsibility, pandemic awareness, COVID-19 impact on daily life, and living in the Daegu/Gyeong-buk area (Table 4).

Table 4  
Factors on COVID-19 preventive behaviors (N = 590)

Variables		B	Std. Error	Std. B	t(p)
(Constant)		2.081	.239		8.694(< .001)
Social responsibility		0.354	.056	0.281	6.289(< .001)
Pandemic awareness		0.131	.054	0.105	2.419(.016)
COVID-19 impact on daily life		0.085	.034	0.099	2.528(.012)
Voluntary service <sup>a</sup>	Yes(regular)	0.003	.055	0.003	0.052(.958)
	Yes(intermittent)	0.132	.073	0.089	1.803(.072)
Residential areas <sup>b</sup>	Daegu & Gyeong-buk	0.134	.056	0.091	2.398(.017)
R <sup>2</sup> = .164 Adj R <sup>2</sup> = .156 F = 19.108 P < .001					
<sup>a</sup> Reference: No, <sup>b</sup> Reference: Except Daegu & Gyeong-buk					

## Discussion

The findings showed that the levels of social responsibility, pandemic awareness, and COVID-19 preventive behavior were high among Korean nursing students and that these factors were positively correlated with each other. Moreover, social responsibility and pandemic awareness were identified as factors influencing COVID-19 preventive behaviors.

The mean COVID-19 preventive behavior of Korean nursing students was 4.38 out of 5 points. Compared to previous studies that used similar measurement tools to measure the level of practicing MERS preventive behavior among nursing and medically inclined college students, the level of COVID-19 preventive behavior in the present study was higher than the level of MERS preventive behavior in previous studies[24]. Such results may be due to COVID-19 being declared a global pandemic, whereas MERS was not declared a global public health emergency. According to the theory of planned behavior, subjective norm affects behavior[25]. Strict strategies for social distancing were implemented by many countries; in particular, South Korea implemented even stricter measures based on its experience from the MERS outbreak. As a result, these factors may have acted as subjective norm.

However, even compared to previous studies on preventive behavior during the 2009 H1N1 pandemic, which was officially declared a pandemic, the results of the present study showed a higher level of preventive behavior. COVID-19 preventive behavior was practiced at a higher level when COVID-19 had a greater effect on daily life and among those who live in the Daegu/Gyeong-buk area. The measurement of the effect of COVID-19 on daily life was intuitive since it was measured by a single item on a 5-point Likert scale, while the Daegu/Gyeong-buk area was the region with the highest number of confirmed cases in South Korea. Such results could be interpreted in the same context as previous studies that reported that perceived concerns, anxiety, and perceived efficacy can improve preventive behavior[26, 27].

The findings of the present study demonstrated the effect of people's perception of a situation on their preventive behavior. Existing studies on the relationship between disaster awareness and response have reported inconsistent results, such as having an influence, or being related without being an influencing factor[28, 29]. It is believed that the findings on this study are because a pandemic is a form of disaster, but it should not be overlooked that the pandemic has been perceived differently from other forms of disasters[14, 30]. Considered together with the additional analysis results from the present study, which showed statistically significantly higher pandemic awareness among students with pandemic education experience ( $F = 6.808, p < .01$ ), customized education for specific disasters should be added to educational strategies suggested for disaster preparedness[31].

Meanwhile, social responsibility was identified as the factor with the biggest influence on COVID-19 preventive behavior in the outcome model of the present study. The mean score for social responsibility among Korean nursing students was 3.84 out of 5 points, which was higher than the score reported in previous studies on nursing students and college students in other majors[32]. This difference could be attributed to the fact that previous studies were conducted under peacetime, whereas the present study was conducted under a disaster situation. In a qualitative synthesis study[33], professional values such as "responsibility to care" were discussed as a competency for infectious disease nursing. But Studies

have reported that under a disaster situation, especially a pandemic, health disparity worsens according to economic level and race[33, 34]. Under such circumstances, society is demanding more social responsibility and appropriate behavior from healthcare professionals, along with a reorganization of the healthcare delivery system[36–39].

The findings in the present study showed that social responsibility had a statistically significant influence on COVID-19 preventive behavior, and thus, inclusion of social responsibility could be a practical strategy for strengthening disaster response competencies. Given the positive relationship between social responsibility and the volunteer experiences of nursing students in the current study, service-learning programs with various vulnerable populations are recommended for nursing students. Community service learning was found to be an effective pedagogical tool for health professional students to enhance their sense of social responsibility[40]. Accordingly, providing opportunities to understand health disparity during a disaster through regular participation in volunteer programs and planning simulation programs that allow indirect experience and immersion in disaster situations could help improve social responsibility, which could ultimately be a practical educational strategy for disaster response.

On the present study, since the measured concept were limited to the individual level, there were limitations in investigating the correlations with environmental factor such as having dependents, job security, and vaccine availability, which have been reported to be factors influencing non-participation in pandemic response. Furthermore, because the study population was limited to Korean nursing students and South Korea differs from other countries with respect to pandemic experience or government response, it is necessary to consider the historical and social context when conducting and interpreting the results of studies on nursing students in other countries.

## **Conclusions**

The present study's significance lies in the fact that it tested the influencing factors of disaster response under a unique disaster situation and introduced the exploratory concept of social responsibility as a measurable variable. As part of future strategies to strengthen disaster response competencies of nursing students, customized educational programs for unique disaster awareness, developmental studies on simulation for inclusion of social responsibility, and correlation studies considering environmental factors are recommended.

## **List Of Abbreviations**

Coronavirus disease 2019 (COVID-19)

KDCA (Korea Disease Control and prevention Agency)

World Health Organization (WHO)

## **Declarations**

**Ethics approval and consent to participate:** This study was approved by the Yonsei University Health System, Institutional Review Board(Y-2020-0057) and informed consent was obtained from all the participants.

**Consent for publication:** Not applicable

**Availability of data and materials:** The datasets generated and/or analyzed during the current study are not publicly available due [the contents of informed consent] but are available from the corresponding author on reasonable request.

**Competing interests:** All the authors declare that they have no competing interests.

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### **Authors' contributions**

MK: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing

HL: Conceptualization, Validation, Supervision, Visualization, Writing - review & editing

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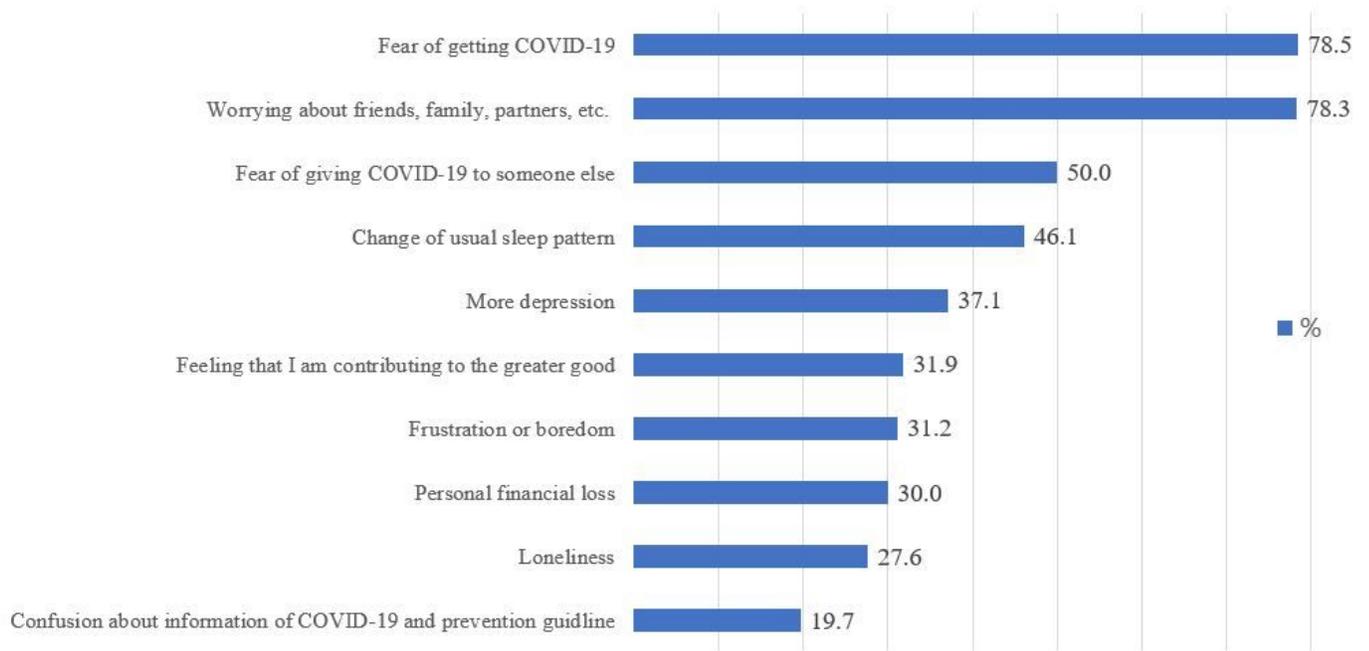
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## Figures



**Figure 1**

With respect to the psychosocial impact of COVID-19, in the total episode that the participants experienced during COVID-19 (multiple responses accepted), the 10 most common episodes' percentage is shown in Figure 1. The three most experienced episodes were "fear of getting COVID-19 (78.5%)," followed by "worrying about friends, family, partners, etc." (78.3%) and "fear of giving COVID-19 to someone else" (50.0%).