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Intentions of frontline nurses regarding COVID-19 patient care: A cross-sectional study in Korea

Yu-Mi Heo RN, MSN[1*] 🆔 | Miyoung Lee RN, PhD[1*] 🆔 | Sun Joo Jang RN, PhD[2] 🆔

[1]College of Nursing, Eulji University, Daejeon, Korea

[2]Red Cross College of Nursing, Chung-Ang University, Seoul, Korea

Correspondence
Sun Joo Jang, Red Cross College of Nursing, Chung-Ang University, 06974, Seoul, Korea.
Email: icedcoffee@cau.ac.kr

Abstract

Aim: This cross-sectional study, conducted from August to September 2020, examined nurses' stress, self-efficacy and nursing intentions when caring for COVID-19 patients and identified the predictors of nursing intentions during the pandemic.

Background: The COVID-19 outbreak has increased nurses' role expectations and imposed a heavy social responsibility. In particular, frontline nurses are under significant stress when caring for patients during a novel epidemic because of the lack of accurate information.

Methods: A total of 232 nurses with experience in providing care for suspected or confirmed COVID-19 patients from seven large hospitals in three cities in Korea completed the Perceived Stress Scale, Self-Efficacy Scale and Predictive Nursing Intention Scale.

Results: Multiple regression confirmed that completing COVID-19-related education and self-efficacy were significant predictors of nursing intentions during the current pandemic; the regression model explained 22.0% of the variance in nursing intentions.

Conclusion: Stress did not affect frontline nurses' nursing intentions towards COVID-19 patient care, but completing COVID-19-related education and higher self-efficacy predicted improved nursing intentions.

Implications for Nursing Management: Nurse leaders should recognize that to improve nursing intentions during a novel infection outbreak, infection-related education should be provided and strategies to improve self-efficacy should be implemented.

KEYWORDS
intention, nurses, pandemics, self-efficacy, stress

1 | BACKGROUND

Coronavirus disease 2019 (COVID-19) is a respiratory infection caused by a novel type of coronavirus (SARS-CoV-2) that was first detected in Wuhan, Hubei province, China, in December 2019 (Wang et al., 2020). The outbreak quickly escalated into a pandemic and subsequently garnered attention globally (The Lancet, 2020). The number of confirmed cases worldwide as of January 2021 was 83 million, with nearly 2 million deaths, and the infection is still rapidly spreading (World Health Organization, 2021).

Frontline nurses working in hospitals routinely experience higher levels of stress than other occupations, as they often work under

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*These authors contributed equally to this work.

pressure to resolve patients' problems and are required to invest substantial personal time to stay updated regarding medical advances and outbreaks of novel infections (García-Izquierdo & Ríos-Rísquez, 2012; Li et al., 2020). Nurses with experience in providing direct care for patients report a higher level of stress than nurses who are not involved in patient care, and the prevalence of posttraumatic stress disorder (PTSD) is higher among nursing professionals who come into close contact with patients than among other health care professionals (Lancee et al., 2008). Previous studies have reported that health care workers experienced a higher level of stress during the severe acute respiratory syndrome (SARS) epidemic (Wu et al., 2009) and that health care workers with a high risk of exposure to SARS infection continued to show a high level of stress even one year after the outbreak, emphasizing the importance of stress management for health care providers (McAlonan et al., 2007).

Novel infections such as COVID-19 trigger negative emotional experiences among health care providers, such as anxiety, stress, insomnia, excessive fear and panic (Al Maqbali et al., 2021; Labrague & De los Santos, 2020; Salari et al., 2020), due to uncertainty regarding the progression of the disease amid a lack of information and accumulated data (Kang et al., 2020). In particular, frontline nurses experience confusion when caring for patients during a novel epidemic because of the lack of accurate information, and they are at risk of infection and experience pain due to losing their patients or colleagues, mental exhaustion, difficulties in patient classification and adverse mental health effects such as PTSD (Kim & Park, 2017; Martin et al., 2013; Maunder et al., 2006). The level of stress among nurses in Wuhan, China, who battled COVID-19 was also markedly higher than the national standard (Mo et al., 2020), again confirming that nurses experience a high level of stress during an epidemic. Excessive stress directly affects nurses' nursing intentions, which refers to their intent to voluntarily provide care, and ultimately causes serious problems of poor care quality and threatens patient safety. In fact, during the SARS and Middle East respiratory syndrome (MERS) outbreaks in the past, many nurses avoided patient care or left their jobs because of fear (Chang et al., 2006; Chen et al., 2005; Maunder, 2004). Further, a qualitative study of nurses providing care for COVID-19 patients showed that they experience psychological problems such as anxiety and hopelessness (Galehdar et al., 2020).

One study reported that continuous outbreaks of novel infections such as COVID-19 increase nurses' role expectations and impose a heavy social responsibility on them. As a result, nurses experience extreme stress in their dilemma between personal safety and social responsibility in patient care (J. S. Kim & Choi, 2016). Such stress hinders nurses' communication and decision-making abilities (Kang et al., 2020). The persistence of such stress can lead to indifferent and unfriendly attitudes towards patients, thereby interfering with effective nursing performance, reducing the quantity and quality of care and diminishing patient satisfaction (O'Brien-Pallas et al., 2010). In addition, previous studies have shown that nursing intentions when taking care of patients with emerging infectious diseases are influenced by providing adequate personal protective equipment to nurses and thereby safeguarding their health (Martin et al., 2013) and by behavioural attitudes and perceived behavioural control of nurses (Lee & Kang, 2020). Thus, it is important to examine the level of stress among nurses providing patient care during the COVID-19 pandemic; further, organisations and society must intervene to promote continued care (Labrague & De los Santos, 2020). In response, this study examined the relationship between stress, self-efficacy and nursing intentions and identified predictors of nursing intentions of frontline nurses during the COVID-19 pandemic.

2 | METHODS

2.1 | Study design, participants and ethical considerations

This cross-sectional study identified predictors of nursing intentions of frontline nurses during the COVID-19 pandemic. Nurses working in seven hospitals in three cities in the Republic of Korea were conveniently sampled. Nurses with prior experience in providing care for patients confirmed or suspected to have COVID-19 were considered, while nurse managers who did not directly provide patient care and nurses with a clinical career of fewer than six months were excluded from the study. The sample size was determined using G*power 3.1.9.2 software. The minimum sample size required for multiple regression with an effect size of 0.15, significance of 0.05, power of 0.95, and 13 predictive variables were 189; to account for a 20% withdrawal rate, the study questionnaire was distributed to 234 nurses. Data were collected from 13 August to 10 September 2020. After excluding two blank questionnaires, 232 of the 234 retrieved questionnaires (100% retrieval rate) were included in the analysis.

Ethical approval was granted by the institutional review board of the researchers' affiliation, Eulji University (protocol code: EUN 20–17 and date of approval: 23 June 2020), and we contacted the nursing divisions at each health care facility before data collection to explain the study's purpose and methods and request their cooperation. The participants received a sheet explaining the purpose and methods of the study and guaranteeing anonymity and were asked to sign an informed consent form. The participants were informed that they had the freedom to withdraw from the study at any time. To ensure anonymity, an anonymous envelope was provided for returning the questionnaires.

2.2 | Measures

2.2.1 | Stress

The level of stress among nurses during the COVID-19 pandemic was measured using the Korean version of the Perceived Stress Scale (KPSS-10). This tool was originally developed by Cohen et al., (1983)

to measure perceived stress in various situations and was adapted to Korean and validated for use with Korean female workers in general hospitals by Lee et al., (2012). The tool comprises 10 items. Items 4, 5, 7 and 8 are negatively worded and thus reverse-coded. Each item is rated on a five-point Likert-type scale from 0 (*never*) to 4 (*very frequently*). The total score ranges from 0 to 40, with a higher score indicating a higher level of perceived stress. Cronbach's α for the KPSS-10 was 0.82 at the time of development and 0.79 in the present study.

2.2.2 | Self-efficacy

Self-efficacy was measured using the Korean version of the Self-Efficacy Scale, originally developed by Sherer et al., (1982), then adapted to Korean by Jung (2007) and validated by Kwon and Oh (2019). The tool comprises 17 items. Each item is rated on a five-point Likert-type scale from 1 (*never*) to 5 (*always*). The total score ranges from 17 to 85, with a higher score indicating a higher level of self-efficacy. Cronbach's α for the Korean version was.94 at the time of development and 0.94 in the present study.

2.2.3 | Nursing intentions

Nursing intentions refer to nurses' willingness to provide patient care (Yoo et al., 2005). Nursing intentions were measured using the Predictive Nursing Intention Scale (original version in Korean), developed and validated by Yoo et al., (2005) during the SARS outbreak and modified and adapted by Kim and Choi (2016) to use in relation to high-risk infectious diseases. The tool comprises 36 items across five subscales: positive behavioural beliefs, negative behavioural beliefs, normative beliefs, control beliefs and nursing intentions. Each item is rated on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The total score ranges from 36 to 252, with higher scores indicating higher nursing intentions. Cronbach's α was 0.92 in the study by Kim and Choi (2016) and 0.94 in the present study.

2.3 | Data analysis

The collected data were analysed using SPSS/WIN 26.0 software applying the following statistical methods. Participants' general characteristics and COVID-19-related characteristics were analysed using descriptive statistics, namely frequency, percentage, mean and standard deviation. Differences in nursing intentions according to general characteristics and COVID-19-related characteristics were analysed using *t* tests and ANOVA followed by Scheffe's test for post hoc comparisons. The relationships between stress, self-efficacy and nursing intentions were analysed using Pearson's correlation coefficient. The predictors of nursing intentions were analysed using multiple regression.

3 | RESULTS

3.1 | Participants' general and COVID-19-related characteristics

Table 1 shows the participants' general and COVID-19-related characteristics. Most participants were female (84.1%), and the mean age was 27.71 (*SD* 4.68) years. Two-thirds of the participants worked in an emergency department or intensive care unit. The mean total clinical career was 4.86 (*SD* 4.66) years. The most common education level was bachelor's degree (67.2%). A total of 89.2% were single and 46.6% lived alone.

In terms of COVID-19 care, 63.8% of the nurses had experienced only isolated inpatient care, while 13.4% had experienced only screening; a total of 22.8% had experienced both. Of the participants, 13.8% had self-quarantined and 58.2% claimed that there was good availability of essential supplies for COVID-19 care, such as personal protective equipment (PPE). While 84.5% had completed PPE-related education in preparation for COVID-19, 68.5% had COVID-19-related education, and 31.5% had no such relevant education.

3.2 | Differences in nursing intentions according to participant characteristics

Table 2 shows the differences in nursing intentions according to participant characteristics. Nursing intentions significantly differed according to gender (*t* = 2.09, *p* =.038) and education level (*F* = 6.311, *p* =.002). Male nurses had a higher nursing intention score than did female nurses, and nurses with a master's degree or higher had a significantly higher nursing intention score than nurses with an associate or bachelor's degree. Nurses who had completed COVID-19-related education exhibit higher nursing intention scores than those without such education (*t* = 3.42, *p* =.001).

3.3 | Correlation between major variables

Table 3 shows the results of the Pearson correlation analysis for total working years, stress, self-efficacy and nursing intentions. Total working years was positively correlated with self-efficacy (*r* = 0.136, *p* =.038). Stress was negatively correlated with self-efficacy (*r* = −0.393, *p* <.001) and nursing intention scores (*r* = −0.218, *p* =.001). Self-efficacy was positively correlated with nursing intention scores (*r* = 0.433, *p* <.001).

3.4 | Predictors of nursing intentions during the COVID-19 pandemic

Table 4 shows the results of multiple regression analysis performed to identify the predictors of nursing intentions during the COVID-19 pandemic. Multiple regression was performed with stress and self-efficacy as the independent variables and gender,

TABLE 1 General and COVID-19-related characteristics of participants (N = 232)

Characteristics	Categories	n	(%)	M ± SD
Age (years)	≤25	92	39.7	27.71 ± 4.68
	26–29	81	34.9	
	30–39	51	22.0	
	≥40	8	3.4	
Gender	Female	195	84.1	
	Male	37	15.9	
Working department	Emergency room	99	42.7	
	Intensive care unit	56	24.1	
	General ward	53	22.8	
	Isolation ward	24	10.3	
Position	Staff nurse	216	93.1	
	Charge nurse	16	6.9	
Working years	<3	99	42.7	4.86 ± 4.66
	3–<6	65	28.0	
	6–<9	31	13.4	
	≥9	37	15.9	
Working years in current units	<3	141	60.8	3.09 ± 2.99
	3–<6	53	22.8	
	6–<9	20	8.6	
	≥9	18	7.8	
Education	3-year college	46	19.8	
	University	156	67.2	
	Graduate school	30	12.9	
Marital status	Single	207	89.2	
	Married	25	10.8	
Living arrangement	With someone else	124	53.4	
	Alone	108	46.6	
Participation in COVID–19 Nursing	Isolated inpatient care only	148	63.8	
	Screening only	31	13.4	
	Both	53	22.8	
Self-isolation due to COVID–19	Yes	32	13.8	
	No	200	86.2	
Availability of essential supplies for COVID–19 care	Good	135	58.2	
	Bad	97	41.8	
Personal protective equipment education	Yes	196	84.5	
	No	36	15.5	
COVID–19-related education	Yes	159	68.5	
	No	73	31.5	

education level and COVID-19-related education, which were significantly associated with nursing intentions, as the control variables after dummy coding, using the enter method. Working years, which was a predictor of nursing intentions in a previous study (Wu et al., 2020) but not in this study, was also entered as a control variable. The independence of the error term was tested using the Durbin–Watson index; a value of 2.07 (du = 1.83, 4-du = 2.17) confirmed independence without autocorrelation, indicating that

the model was suitable for regression analysis. The variance inflation factors for the independent variables were all below 10, with a range of 1.05–1.27, confirming the absence of multicollinearity.

The regression model showed that COVID-19-related education and self-efficacy were significant predictors of nursing intention scores, explaining 22.0% of the variance ($F = 10.59$, $p < .001$). The effect size in this study ($f^2 = 0.28$), calculated based on the formula of Cohen (1988), approached the value denoting a large effect size ($f^2 = 0.35$;

TABLE 2 Differences in nursing intention according to general and COVID-19-related characteristics

Characteristics	Categories	N	Nursing intention	
			M ± SD	t/F (p) Scheffe's test
Age	≤25	92	161.60 ± 29.39	0.76 (0.516)
	26 ~ 29	81	164.92 ± 28.48	
	30 ~ 39	51	164.06 ± 27.46	
	≥40	8	177.00 ± 42.03	
Gender	Female	195	162.13 ± 28.81	2.09 (0.038)
	Male	37	172.92 ± 29.26	
Working department	Emergency room	99	163.80 ± 29.66	0.16 (0.920)
	Intensive care unit	56	165.36 ± 28.73	
	General ward	53	162.49 ± 28.93	
	Isolation unit	24	166.25 ± 29.49	
Position	Staff nurse	216	163.34 ± 28.57	0.97 (0.334)
	Charge nurse	16	170.63 ± 35.87	
Working years	<3	99	162.30 ± 29.87	0.93 (0.428)
	3–<6	65	161.22 ± 25.63	
	6–<9	31	167.58 ± 31.05	
	≥9	37	169.54 ± 31.24	
Working years in current unit	<3	143	162.76 ± 28.69	1.68 (0.173)
	3–<6	53	160.17 ± 27.28	
	6–<9	20	174.75 ± 37.13	
	≥9	18	171.11 ± 25.60	
Level of education	3-Year college[a]	46	160.87 ± 32.35	6.31 (0.002) a,b < c
	University[b]	158	161.44 ± 27.72	
	Graduate school[c]	30	181.03 ± 25.75	
Marital status	Single	207	163.08 ± 28.73	1.16 (0.247)
	Married	25	170.20 ± 31.83	
Living arrangement	With someone else	124	164.47 ± 28.38	0.23 (0.818)
	Alone	108	163.11 ± 30.00	
Participation in COVID–19 nursing	Caring for isolated patients	148	164.85 ± 29.21	0.61 (0.542)
	Screening clinic	31	158.48 ± 26.80	
	Both	53	163.82 ± 29.09	
Self-isolation due to COVID–19	Yes	32	163.28 ± 28.94	0.91 (0.365)
	No	200	167.21 ± 30.21	
Availability of essential supplies for COVID–19 care	Good	135	166.33 ± 28.04	1.55 (0.122)
	Bad	97	160.34 ± 30.31	
Personal protective equipment education	Yes	196	165.08 ± 29.05	1.54 (0.126)
	No	36	157.00 ± 28.80	
COVID–19-related education	Yes	159	168.14 ± 28.93	3.42 (0.001)
	No	73	154.41 ± 27.34	

Kang et al., 2015). Self-efficacy was the most potent predictor of nursing intentions, while intentions were unaffected by total length of employment, gender, education level and stress. The goodness of fit of the regression model was tested using the Kolmogorov–Smirnov test and Breusch–Pagan test, which indicated that the assumptions of normality and equal variance were satisfied.

4 | DISCUSSION

This study investigated the predictors of nursing intentions among frontline nurses during the COVID-19 pandemic. In this study, nursing intention scores during the pandemic were similar to the scores for nursing intention reported by H. J. Kim and Choi (2016) for

TABLE 3 Correlation between working years, stress, self-efficacy and nursing intention (N = 232)

Variables	Working years r (p)	Stress r (p)	Self-efficacy r (p)	Nursing intention r (p)
Working years	1			
Stress	−0.114 (0.084)	1		
Self-efficacy	0.136* (0.038)	−0.393*** (<0.001)	1	
Nursing intention	0.112 (0.089)	−0.218** (0.001)	0.433*** (<0.001)	1

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

TABLE 4 Factors influencing nursing intention (N = 234)

| Variable | Nursing intention | | | | | | 95% Confidence interval | |
	B	SE	β	t	p	VIF	Lower	Upper
(Constant)	101.56	16.51		6.15	<0.001		69.03	134.09
Working years	0.55	0.41	−0.09	1.34	0.182	1.23	−0.26	1.35
Gender[a]	−6.40	4.86	−0.08	−1.32	0.190	1.09	−15.98	3.19
Level of education[a]	5.25	4.65	−0.07	−1.13	0.260	1.18	−14.41	3.92
COVID−19-related education[a]	8.65	3.78	0.14	2.29	0.023	1.05	1.20	16.10
Stress	−0.23	0.38	−0.04	−0.60	0.552	1.22	−0.97	0.52
Self-efficacy	1.10	0.20	0.36	5.47	<0.001	1.27	0.70	1.49
Adjusted R^2 = 0.220, F = 10.59 (p <.001)								
Durbin–Watson's du = 2.07 (du = 1.83, 4-du = 2.17), Breusch–Pagan test (χ^2 = 5.62, p =.467)Kolmogorov–Smirnov test (Z = 0.05, p =.568)								

Abbreviation: VIF, variance inflation factor.

[a]Dummy variable (reference): gender (male), education (3-year college), COVID-19-related education (none)

patients with high-risk pathogen infections and by Oh et al., (2017) for patients with novel infections among nurses who experienced the MERS outbreak.

The present study identified gender, COVID-19-related education and education level as predictors of nursing intentions towards patients with COVID-19. Male nurses had significantly higher nursing intentions than did their female counterparts, consistent with previous reports regarding emerging infectious diseases (Lee & Kang, 2020) and Ebola (Narasimhulu et al., 2016). However, a previous study of frontline nurses providing care for COVID-19 patients (Eddieson Pasay-an, 2020) found that female nurses showed slightly higher nursing intentions, encompassing aversion to germs and concerns about infectibility compared with male nurses, although the difference was not statistically significant.

In this study, education level significantly predicted nursing intentions, consistent with Kim and Choi's (2016) finding that more highly educated nurses showed greater nursing intentions; however, the current results contrast with Lee and Kang's (2020) observation that nursing intentions did not differ by education level. In addition, other studies (Lee & Kang, 2020; Oh et al., 2017) also reported that prior experience with an infection outbreak significantly predicted nursing intentions, while the level of relevant knowledge and infection-related education did not. There may be two reasons for this inconsistency. First, disease characteristics, such as the pathogenicity of infection, infectivity, treatability and preventability with

a vaccine, differ between infectious diseases such as SARS, Ebola, MERS and COVID-19. Second, as opposed to education level, relevant knowledge and simulation learning using real-world scenarios boost self-efficacy (Garner et al., 2018; Hung et al., 2021) and, consequently, increase nursing intentions. In the future, systematic education, such as scenario-based training, infection-related education and PPE-related education, are needed to foster a positive attitude among frontline nurses during the outbreak of a novel infection and help them provide safe and quality care. Improving self-efficacy and nursing competency through education and training would be helpful in preparation for future pandemics (Lee & Kang, 2020).

The level of perceived stress while providing care for COVID-19 patients was high (19.94; SD 4.99) in this study and close to the 19.19 reported by Eddieson Pasay-an (2020) using the same instrument. A systematic review of the mental health of health care providers who directly provide care for COVID-19 patients showed that they are extremely stressed by the potential infection risk and insufficient availability of essential supplies (Salari et al., 2020). This study's regression analysis showed that stress did not influence nurses' intention to provide care for COVID-19 patients, which contradicts Oh et al., (2017). Previous studies conducted during the COVID-19 pandemic (Nashwan et al., 2020; Wu et al., 2020) found that approximately 90% of nurses gladly volunteered for COVID-19 patient care despite high perceived stress provoked by COVID-19. Because exposure to infection risk is inevitable, due to the nature

of nurses' work and responsibility in providing care for COVID-19 patients (Fawaz et al., 2020) and also because nurses consider themselves pivotal frontline work (Liu et al., 2020), stress seemed to have not influenced nursing intentions in this study because of nurses' professional work ethic. A longitudinal study reported that nurses caring for COVID-19 patients experience a high level of psychological and physical health problems (Cai et al., 2020) and a higher level of stress during the epidemic, which persists for one year (McAlonan et al., 2007; Wu et al., 2009). Thus, although stress does not seem to influence nurses' intention to provide care for patients, stress management for nurses is essential.

In this study, self-efficacy predicted nursing intentions. Self-efficacy refers to one's expectations and beliefs regarding their ability to successfully perform a task (Lee & Ko, 2010). It is closely related to motivation and accomplishment; individuals with high self-efficacy do not easily quit, but rather increase their efforts to overcome challenges (Salanova et al., 2011). Previous studies reported that nurses with high self-efficacy demonstrated good adjustment to situations (Iwu & Holzemer, 2014; Van Dyk et al., 2016), good work performance (Iwu & Holzemer, 2014) and high nursing intentions during an infection outbreak (Oh et al., 2017), consistent with our findings. Thus, systematic education and training on infections and infection management, as well as organisational efforts to promote self-efficacy, are crucial to increase the nursing intentions of frontline nurses during the outbreak of a novel infection.

Our study had a few limitations. First, the study was limited to Korea, which precludes it from having global generalizability. Furthermore, we used convenience sampling sampled, which risked selection bias. This selection bias, namely that most participants were early-career nurses with an average of fewer than nine years of experience, may be why working years did not significantly predict nursing intentions, unlike in a previous study (Wu et al., 2020) in which the range of working years was relatively evenly distributed. Therefore, future studies should use methods such as quota sampling to evaluate a wide range of experience In addition, the nature of a cross-sectional study limits any examination of causality. Future studies should address these limitations.

5 | CONCLUSIONS

This cross-sectional study examined levels of stress, self-efficacy and nursing intentions and identified the predictors of nursing intentions among frontline nurses during the COVID-19 pandemic. Stress was negatively correlated with self-efficacy and nursing intentions, and infection-related education and self-efficacy were identified as predictors of nurses' intention to provide care for patients with COVID-19.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

New infectious diseases such as COVID-19 will continue to emerge in the future, and a third COVID-19 wave is expected to occur in the near future. Frontline nurses are fighting a highly contagious novel infectious disease with no cure or vaccine amidst global uncertainty. This study's insights are that nursing managers may improve the nursing intentions of frontline nurses during future novel infection outbreaks by providing infection-related educational opportunities and strategies to improve self-efficacy. More specifically, nurses working in the field would benefit from opportunities for simulation education using mixed reality and virtual reality, as well as various other teaching methods.

CONFLICTS OF INTEREST
The authors declare no conflict of interest. The funder had no role in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

AUTHOR CONTRIBUTIONS
Y.H, M.L. and S.J.J. contributed to conceptualization, methodology, software, validation, formal analysis, investigation, data curation, writing—original draft preparation, writing—review and editing, visualization and project administration; M.L. and S.J.J. made supervision; and S.J.J. acquired funding. All authors have read and agreed to the published version of the manuscript.

ETHICAL APPROVAL
The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethical Committee of Eulji University (protocol code: EUN 20–17 and date of approval: 23 June 2020).

INFORMED CONSENT STATEMENT
Informed consent was obtained from all subjects involved in the study.

DATA AVAILABILITY STATEMENT
The data presented in this study are available on request from the corresponding author and with permission of the Institutional Review Board of Eulji University.

ORCID
Yu-Mi Heo https://orcid.org/0000-0002-1591-0280
Miyoung Lee https://orcid.org/0000-0002-1445-5108
Sun Joo Jang https://orcid.org/0000-0002-7655-1744

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