



# Burnout and Resilience among Emergency Physicians at Korean University Hospitals during the COVID-19 Pandemic: A Cross-Sectional Analysis

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**Purpose:** This study aimed to investigate burnout and resilience among emergency physicians (EPs) at university teaching hospitals during the coronavirus disease (COVID-19) pandemic.

**Materials and Methods:** In April to May 2021, a survey was administered to 331 and 309 emergency medicine specialists and residents, respectively, from 31 university teaching hospitals in Korea. Data on the respondents' age, sex, designation, working area, experience with treating COVID-19 patients, and personal experience with COVID-19 were collected. Based on the participants' characteristics, quality of life (compassion satisfaction, burnout, and secondary traumatic stress), resilience, emotional content, and self-image were analyzed.

**Results:** A total of 247 responses were analyzed. Compared to specialists, compassion satisfaction and resilience in residents were not good, burnout was severe, and emotional content and self-image were less positive. Experiences with treating COVID-19 patients did not cause any difference in quality of life, resilience, emotional content, and self-image among participant subgroups. Personal COVID-19 experiences were associated with poor compassion satisfaction, resilience, less positive emotional content and self-image, and severe burnout. Compassion satisfaction, secondary traumatic stress, and resilience can definitively affect burnout.

**Conclusion:** The quality of life and resilience of EPs in university teaching hospitals in Korea during the COVID-19 pandemic have been low. Supportive measures to improve resilience can prevent burnout among emergency staff, particularly residents and EPs, with personal experiences related to COVID-19.

**Key Words:** COVID-19, compassion fatigue, burnout, professional, emergency medicine, resilience

## INTRODUCTION

The coronavirus disease (COVID-19) pandemic has created

**Received:** September 9, 2021 **Revised:** December 29, 2021

**Accepted:** December 29, 2021

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•The authors have no potential conflicts of interest to disclose.

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an unprecedented global crisis, has changed healthcare delivery systems, and continues to threaten the lives of healthcare workers. Amnesty International reported that more than 17000 healthcare workers died in 2020.<sup>1</sup> All healthcare workers have experienced severe stress and burnout during the COVID-19 pandemic due to the burdens of screening and treating patients with fever and respiratory symptoms, as well as the risk from direct exposure to COVID-19 patients. Further, healthcare workers suffer from excessive workloads leading to health-related issues, psychological stress and burnout, lifestyle changes, and fear of infection when treating COVID-19 patients.<sup>2</sup>

People in occupations that involve helping others, such as healthcare workers, can experience compassion fatigue or

burnout. Emergency physicians (EPs) with irregular working hours are often exposed to verbal/nonverbal violence due to unpredictable situations in the emergency room and oftentimes may experience high levels of stress and burnout from evaluating and treating patients. Meanwhile, research has shown that physician burnout is associated with patient safety and quality of care.<sup>3</sup> In addition to burnout, compassion satisfaction and secondary traumatic stress are sub-factors in Professional Quality of Life (ProQOL), which are also associated with each other. Indeed, according to a 2015 report on emergency medicine specialists in Korea, burnout was the main reason for workers in the emergency room to opt for early retirement.<sup>4</sup> A study in the United Kingdom indicated that EPs had more severe burnout than other doctors in other departments.<sup>5</sup> In the United States, the stress levels of EPs during the COVID-19 pandemic were recently investigated, and the results showed that the degree of emotional burnout had increased.<sup>6</sup> However, there are no recent reports on the quality of life, including burnout, among Korean EPs during the COVID-19 pandemic.

It is essential that healthcare workers can recover from burnout to efficiently fulfill their job again. The ability to cope with burnout is called resilience, which acts as a shield against work-related stress.<sup>7</sup> In a previous study, the resilience of UK doctors was lower than that of the general population.<sup>5</sup> For nurses, resilience is an important factor that can improve clinical performance,<sup>8</sup> and a higher resilience leads to better work performance.<sup>9</sup> It is necessary to determine how burnout, one of the professional qualities of life, and resilience differ according to the characteristics of EPs or with respect to personal experiences, as well as the interrelationship between these aspects to prepare a plan for preventing burnout and developing resilience as a way of ensuring work satisfaction among EPs, during the COVID-19 pandemic.

This study aimed to investigate ProQOL, which includes compassion satisfaction, burnout, and secondary traumatic stress, and resilience among EPs to determine differences therein in relation to their characteristics and experiences with COVID-19. Furthermore, we sought to investigate factors affecting burnout, as a final outcome of unrelenting stress, to suggest a support plan for EPs.

## MATERIALS AND METHODS

### Study design and participants

A questionnaire survey that targeted 331 emergency medicine specialists and 309 emergency medicine residents in 31 university teaching hospitals in South Korea was prospectively conducted from April to May 2021. The participating hospitals were invited by the authors by phone. The survey was conducted using SurveyMonkey (<https://ko.surveymonkey.com>), and a link to the survey was delivered to a professor at each university hospital for further dissemination to emergency medi-

cine specialists and residents within the respective participating university hospital. This study was approved by the Institutional Review Board of Yonsei University Wonju Christian Severance Hospital (CR321005).

### Measured variables

Information on the baseline characteristics, including age, sex, and job position (specialist/resident), of the respondents were collected. In addition, the following questions were asked to determine whether the participants had treated or had any personal experiences with COVID-19 patients: "Did you treat COVID-19 patients in a hospital or residential treatment center?" and "Was the patient who you were treating diagnosed with COVID-19?" When the participants answered "Yes" to at least one of the two questions, they were included in the "Subgroup with experience in treating COVID-19 patients." Additionally, the following questions were asked: "Did you have COVID-19?"; "Did any of your family members have COVID-19?"; "Were you quarantined for 14 days?"; and "Were any of your family members quarantined for 14 days?" When the response to at least one of the four questions was "Yes," the participants were included in the "Subgroup with personal experiences with COVID-19." In South Korea, part of the COVID-19 protocol is for individuals who come into close contact with a COVID-19 patient to undergo a 14-day self-quarantine, and any attempt to break out of quarantine is punishable by law.

### ProQOL Scale

The ProQOL Scale is used to determine how often people who have jobs helping others experience compassion satisfaction and fatigue in the past 30 days from the date of the response. In our study, the Korean version of the ProQOL Scale version 5 was used.<sup>10</sup> The ProQOL Scale comprises 30 items in total, with 10 items each in the categories of compassion satisfaction, burnout, and secondary traumatic stress associated with caregiving; the score is based on a 5-point Likert scale rating (1=never, 5=very often). At the time of development, the reliability of the Korean ProQOL Scale was determined to have a Cronbach's  $\alpha$  of 0.88, 0.74, and 0.81 for compassion satisfaction, burnout, and secondary traumatic stress, respectively.<sup>11</sup>

### Connor-Davidson Resilience Scale

The 25-item Connor-Davidson Resilience Scale (CD-RISC) is a tool for measuring an individual's ability to cope with stress and adversity in the past month.<sup>12</sup> Answers on a 5-point Likert scale (0=not true at all, 4=true nearly all of the time) are added up to a maximum score of 100 points, and a higher score indicates a higher level of resilience. In Korea, the Korean CD-RISC, which is a translated and adapted from the CD-RISC, is used, and the reliability of the Korean version of the CD-RISC is indicated by a Cronbach's  $\alpha=0.91$ .<sup>13</sup>

**Silver Draw-A-Story test**

The Draw-A-Story (DAS) test is a projective drawing test that was developed by Rawley Silver to detect hidden depression or aggression. The DAS test allows respondents to respond less defensively than the ProQOL and CD-RISC and recognizes the respondent’s inner world. The respondent chooses two out of 14 stimulus images, imagines what will happen between the two images, develops a story, and then describes a feeling that is close to their state. On the Emotional Content Scale (ECS), a lower score is assigned when the relationship between the two images is destructive and threatening, and a higher score is assigned when the relationship between the two images is peaceful and positive. On the Self-Image Scale (SIS), a lower score is assigned to a sad and negative feeling, and a higher score is assigned for achievement and happiness according to the status of the subject with whom the respondent identifies.<sup>14,15</sup> In this study, the ECS and SIS were scored on a scale of 1 to 5, and the analysis of response data was performed by an art therapy-training specialist (ESK).

**Statistical analysis**

All continuous variables are presented as means±standard deviations, and SAS 9.4 (SAS Institute Inc., Cary, NC, USA) and R 4.0.5 (Institute for Statistics and Mathematics, Vienna, Austria; www.R-project.org) were used for the statistical analyses. Significance was set at *p*<0.05. The reliability of the questionnaire items was tested using internal consistency (Cronbach’s *α*). The intergroup differences among the subgroups that were constituted according to the participant’s characteristics, experience in treating COVID-19 patients, and personal experience with COVID-19 were compared using Student’s t-test or chi-square test. Multiple regression analyses were performed to determine associations among DAS sub-scales scores, compassion satisfaction, secondary traumatic stress, resilience scale score, demographics, and burnout among the participants.

**RESULTS**

Of the 640 EPs who were sent the survey questionnaire, a total of 256 EPs responded (response rate: 40%). Among these, 247 responses were analyzed after excluding nine respondents who submitted incomplete responses. The Cronbach’s *α* for the subcategories of the ProQOL Scale were 0.925, 0.745, and 0.835 for compassion satisfaction, burnout, and the secondary traumatic stress associated with caregiving, respectively. The Cronbach’s *α* values of the ProQOL Scale and CD-RISC were 0.768 and 0.935, respectively. More than half of the respondents were in their 30s; there were 184 (74.5%) male participants and 137 (55.5%) specialists. Among the participants, 52 (21.1%) treated patients who were confirmed to have COVID-19, and 169 (68.4%) treated patients who were subsequently confirmed to have COVID-19. Moreover, one participant had

COVID-19 and five participants had family members who had COVID-19. In addition, 59 participants experienced COVID-19-related self-isolation, and 15 of these participants undertook self-isolation with their family members. Regarding the professional quality of life of all respondents, the mean scores for compassion satisfaction, burnout, and the secondary traumatic stress associated with caregiving were 27.62±5.11, 33.81±6.56, and 25.18±0.82, respectively. The mean CD-RISC score was 59.43±13.23, and from the Silver DAS test, the mean scores of the SIS and ECS were 3.45±1.19 and 3.29±1.21, respectively (Table 1).

Residents had more relevant personal experiences than the specialists (41.82% vs. 17.52%, *p*<0.001). Specialists had higher compassion satisfaction scores (*p*=0.019), lower burnout scores (*p*=0.006), and higher resilience scores (*p*=0.001), as well as more positive emotional content and self-image (*p*=0.013 and *p*=0.009, respectively), than residents (Table 2). Sex-stratified analysis showed that female had more positive self-image and emotional content (*p*=0.043 and *p*=0.031, respectively), al-

**Table 1.** Characteristics of Survey Participants (n=247)

Variables	Value
Age (yr)	
<30	35 (14.2)
30–39	127 (51.4)
40–49	69 (27.9)
≥50	16 (6.5)
Sex	
Male	184 (74.5)
Female	63 (25.5)
Position	
Specialists	137 (55.5)
Residents	110 (44.5)
Experience with treating COVID-19 patients	
I treated COVID-19 patients in a hospital or residential treatment center	52 (21.1)
The patient I treated was diagnosed with COVID-19	169 (68.4)
Personal experience with COVID-19	
I had COVID-19	1 (0.4)
My family members had COVID-19	5 (2.0)
I was quarantined for 14 days	59 (23.9)
My family was quarantined for 14 days	15 (6.1)
Professional quality of life	
Compassion satisfaction	27.62±5.11
Burnout	33.81±6.56
Secondary traumatic stress associated with caregiving	25.18±0.82
Connor-Davidson Resilience Scale	59.43±13.23
Silver Draw-A-Story test	
Self-Image Scale	3.45±1.19
Emotional Content Scale	3.29±1.21

COVID-19, coronavirus disease. Continuous variables are presented as means±standard deviations or n (%).

**Table 2.** Comparison of the Characteristics of Specialists with Those of Residents

Variables	Specialists (n=137)	Residents (n=110)	p-value
Age (yr)			<0.001
<30	1 (0.73)	34 (30.91)	
30–39	53 (38.69)	74 (67.27)	
40–49	67 (48.91)	2 (1.82)	
≥50	16 (11.67)	0 (0)	
Sex			0.756
Male	101 (73.72)	83 (75.45)	
Female	36 (26.28)	27 (24.55)	
Experience with treating COVID-19 patients			0.055
Yes	92 (67.15)	86 (78.18)	
No	45 (32.85)	24 (21.82)	
Personal experience with COVID-19			<0.001
Yes	24 (17.52)	46 (41.82)	
No	113 (82.48)	64 (58.18)	
Professional quality of life			
Compassion satisfaction	34.71±6.46	32.69±6.53	0.019
Burnout	26.82±4.88	28.62±5.23	0.006
Secondary traumatic stress associated with caregiving	25.77±5.31	24.45±6.35	0.082
Connor-Davidson Resilience Scale	61.89±13.30	56.35±12.54	0.001
Silver Draw-A-Story test			
Self-Image Scale	3.62±1.19	3.25±1.16	0.013
Emotional Content Scale	3.47±1.17	3.06±1.24	0.009

COVID-19, coronavirus disease. Continuous variables are presented as means±standard deviations or n (%).

though there was no significant difference between the sexes in these aspects (Table 3).

There was no difference in the professional quality of life, resilience, ECS, and SIS in the analysis that was stratified by experiences with treating COVID-19 patients (Table 4). In addition, compassion satisfaction and resilience scores of participants with personal experiences with COVID-19 were lower ( $p=0.008$  and  $p=0.001$ , respectively). Participants with personal experiences with COVID-19 also had higher burnout scores ( $p=0.012$ ), and more negative self-image and emotional content components than their counterparts ( $p=0.001$  and  $p=0.014$ , respectively) (Table 5).

In multivariate analyses, compassion satisfaction score ( $\beta=-0.413$ ,  $p<0.001$ ), secondary traumatic stress score ( $\beta=0.414$ ,  $p<0.001$ ), and resilience scale score ( $\beta=-0.065$ ,  $p=0.001$ ) were identified as significantly affecting burnout. These were found to explain 67% of all variables ( $R^2=0.6717$ ,  $p<0.05$ ) (Table 6).

## DISCUSSION

In this study, professional quality of life, particularly burnout, and resilience of EPs in university teaching hospitals during

**Table 3.** Sex-Stratified Comparison of the Participants

Variable	Male (n=184)	Female (n=63)	p-value
Age (yr)			0.128
<30	28 (15.22)	7 (11.11)	
30–39	88 (47.83)	39 (61.90)	
40–49	53 (28.80)	16 (25.40)	
≥50	15 (8.15)	1 (1.59)	
Position			0.756
Specialists	101 (54.89)	36 (57.14)	
Residents	83 (45.11)	27 (42.86)	
Experience with treating COVID-19 patients			0.896
Yes	133 (72.28)	45 (71.43)	
No	51 (27.72)	18 (28.57)	
Personal experience with COVID-19			0.116
Yes	57 (30.98)	13 (20.63)	
No	127 (69.02)	50 (79.37)	
Professional quality of life			
Compassion satisfaction	34.10±6.59	32.95±6.43	0.333
Burnout	27.48±5.01	28.03±5.41	0.625
Secondary traumatic stress associated with caregiving	24.95±5.70	25.84±6.16	0.296
Connor-Davidson Resilience Scale	59.61±13.45	58.89±12.64	0.710
Silver Draw-A-Story test			
Self-Image Scale	3.36±1.18	3.71±1.20	0.043
Emotional Content Scale	3.19±1.23	3.57±1.12	0.031

COVID-19, coronavirus disease. Continuous variables are presented as means±standard deviations or n (%).

the COVID-19 pandemic were investigated. Residents and survey participants with personal experiences with COVID-19 had higher burnout scores and lower resilience, self-image, and emotional content scores than their counterparts, although these were not directly associated with burnout in multiple regression analysis. The sex and experience of respondents in treating COVID-19 patients did not significantly change quality of life, resilience, emotional content, and self-image.

The burnout score of all respondents in our study was higher and the compassion satisfaction score was lower than a study on UK EPs, which was conducted before the COVID-19 pandemic.<sup>5</sup> Approximately 75% of EPs in the United States complained of burnout after the beginning of COVID-19 pandemic, and this burnout caused severe job dissatisfaction. In particular, isolation from family and friends due to the fear of infection reportedly exacerbated burnout.<sup>16</sup> Meanwhile, the scores of our participants were worse than the scores of the three items of the ProQOL Scale in a study conducted in Wuhan at the beginning of the COVID-19 pandemic.<sup>17</sup> In other words, the quality of life of EPs in Korea is poorer than that in the Wuhan study. Our study was conducted more than 15 months after the start of the COVID-19 epidemic in Korea, indicating that COVID-19-induced burnout among EPs has accumulated since the on-

set of the pandemic.

Compared to resilience scores among EPs in the UK before the COVID-19 pandemic, the resilience scores among EPs in our study were lower, signifying that our respondents have decreased resilience in a situation that leads to poor quality of life.<sup>5</sup> Attention to the issue of burnout and the resilience of EPs is

required, and the implementation of interventions to strengthen the resilience of EPs is necessary.

The quality of life and resilience scores of Korean EPs were low, whereas their emotional content and self-image scores were relatively positive when compared with previous studies in other populations.<sup>18-20</sup> This finding can be partly attributable

**Table 4.** Subgroup Comparison of Participants with and without Experiences with Treating COVID-19 Patients

Variables	Yes (n=178)	No (n=69)	p-value
Age (yr)			0.022
<30	32 (17.98)	3 (4.35)	
30–39	92 (51.69)	35 (50.72)	
40–49	44 (24.72)	25 (36.23)	
≥50	10 (5.61)	6 (8.70)	
Sex			0.896
Male	133 (74.72)	51 (73.91)	
Female	45 (25.28)	18 (26.09)	
Position			0.055
Specialists	92 (51.69)	45 (65.22)	
Residents	86 (48.31)	24 (34.78)	
Personal experience with COVID-19			0.081
Yes	56 (31.46)	14 (20.29)	
No	122 (68.54)	55 (79.71)	
Professional quality of life			
Compassion satisfaction	33.52±6.53	34.57±6.60	0.222
Burnout	27.97±5.12	26.74±5.01	0.077
Secondary traumatic stress associated with caregiving	25.35±6.03	24.74±5.26	0.462
Connor-Davidson Resilience Scale	58.53±12.94	61.72±13.79	0.089
Silver Draw-A-Story test			
Self-Image Scale	3.46±1.20	3.45±1.18	0.973
Emotional Content Scale	3.27±1.23	3.33±1.17	0.712

COVID-19, coronavirus disease.  
Continuous variables are presented as means±standard deviations.

**Table 5.** Subgroup Comparison of Participants Who Did and Did not Personally Experience COVID-19

Variables	Yes (n=70)	No (n=177)	p-value
Age (yr)			0.011
<30	11 (15.71)	24 (13.56)	
30–39	46 (65.72)	81 (45.76)	
40–49	11 (15.71)	58 (32.77)	
≥50	2 (2.86)	14 (7.91)	
Sex			0.116
Male	57 (81.43)	127 (71.75)	
Female	13 (18.57)	50 (28.25)	
Position			<0.001
Specialists	24 (34.29)	113 (63.84)	
Residents	46 (65.71)	64 (36.16)	
Experience with treating COVID-19 patients			0.081
Yes	56 (80.00)	122 (68.93)	
No	14 (20.00)	55 (31.07)	
Professional quality of life			
Compassion satisfaction	32.06±5.84	34.50±6.70	0.008
Burnout	29.09±5.10	27.05±5.01	0.012
Secondary traumatic stress associated with caregiving	25.93±6.54	24.88±5.50	0.203
Connor-Davidson Resilience Scale	54.83±13.42	61.24±12.74	0.001
Silver Draw-A-Story test			
Self-Image Scale	3.06±1.20	3.61±1.15	0.001
Emotional Content Scale	2.99±1.21	3.41±1.20	0.014

COVID-19, coronavirus disease.  
Continuous variables are presented as means±standard deviations or n (%).

**Table 6.** Multivariable Regression Analysis of Factors Associated with Burnout

Variables	Beta	Standard error	T value	p-value
Intercept	35.610	1.613	22.07	<0.001
Emotional Content Scale	-0.258	0.238	-1.09	0.279
Self-Image Scale	0.024	0.250	0.10	0.923
Compassion satisfaction	-0.413	0.039	-10.52	<0.001
Secondary traumatic stress associated with caregiving	0.414	0.036	11.62	<0.001
Connor-Davidson Resilience Scale	-0.065	0.020	-3.24	0.001
Sex (ref.=male)	-0.279	0.452	-0.62	0.537
Age (ref. ≤30 years)				
30–39	-0.150	0.629	-0.24	0.812
40–49	-0.020	0.821	-0.02	0.981
≥50	-1.076	1.065	-1.01	0.313
Position (ref.=specialists)	0.941	0.522	1.80	0.073
Personal experience with COVID-19 (ref.=yes)	-0.157	0.437	-0.36	0.720

COVID-19, coronavirus disease; ref., reference

to the respondents' will to overcome the COVID-19 pandemic and a positive outlook that was reflected in their overall emotional content scores. While COVID-19 had a negative impact on the quality of life and resilience of EPs, this did not lead to aggression in any respondent.

Similar to other studies, residents were psychologically vulnerable in this study. An Italian study revealed that the anxiety scores of residents were higher than those of physicians and nurses at the onset of the COVID-19 pandemic.<sup>21</sup> Although more than half of the American doctors experienced burnout, the resilience score of the emergency medicine residents was higher than that of the residents from other departments.<sup>22</sup> Considering that the resilience of emergency medicine residents in the United States was better than that of residents from other departments, we infer that resilience among the residents in this study might be better than that of residents in other departments. Strengthening of resilience is thus needed, not only for emergency medicine residents but also for residents in other departments.

In studies conducted during the COVID-19 pandemic, female EPs and healthcare workers had greater work and home anxiety than male EPs and healthcare workers,<sup>6</sup> and had greater feelings of isolation and burnout.<sup>23,24</sup> This was also observed in a study wherein Portuguese female doctors had more patient-related burnout than male doctors.<sup>25</sup> Nonetheless, while female appear to be more vulnerable to stress-related factors, there were no differences in the quality of life or resilience between the sexes in our study. However, emotional content and self-image among female EP were more positive than that of male EPs, which is in line with Silver's findings that male tend to describe aggressive and negative relationships, compared to female.<sup>26</sup> Although earlier studies showed that female experienced more severe burnout, the burnout rates of female in our study did not differ from those of male; therefore, further research is needed to determine whether this aspect is related to a positive emotional content and self-image.

In our study, approximately 71% (178/247) of EPs treated COVID-19 patients, which was less than the proportion of US EPs who treated COVID-19 patients (98.5%).<sup>6</sup> Interestingly, there were no differences in the quality of life and resilience of the participants based on their experiences with treating COVID-19 patients. However, this does not indicate that EPs who did not treat COVID-19 patients did not encounter any problems, as their quality of life and resilience could be on par with EPs who treated COVID-19 patients. In Israel, internal medicine residents in hospitals where COVID-19 patients were not treated were as anxious as those in hospitals where COVID-19 patients were treated.<sup>27</sup> In addition, at the time of the COVID-19 epidemic in Wuhan, healthcare workers outside Wuhan were concerned about the possibility of transmitting the infection to their families to the same extent as healthcare workers in Wuhan, and their overall level of fear was similar.<sup>28</sup>

Participants with personal experiences with COVID-19

showed lower quality of life and resilience scores. EPs usually work in the emergency room, and constantly deal with the risk of infection and the need to consider personal protection. However, EPs and their family members are now experiencing the threat of COVID-19 to their safety, which might be one of the reasons for lower QOL and resilience scores. Similar results have been reported in other countries. In a study of EPs and nurses in the UK, Poland, and Singapore, the percentage of participants with severe burnout was higher when they contracted COVID-19 than when they treated COVID-19 patients in the past week.<sup>29</sup> Portuguese physicians had more severe personal burnout than those with severe patient-related burnout.<sup>25</sup> Furthermore, US EPs were concerned about the impact of COVID-19 exposure on their family life while working in the emergency room.<sup>6</sup> In a study of all emergency healthcare workers, there were concerns about probable transmission of COVID-19 to their family members.<sup>23</sup> In addition, when their personal life or if their family members were affected by COVID-19, high scores were observed for anxiety, depression, and stress among the participants.<sup>21</sup>

Multiple regression analysis was performed with variables that were estimated to ultimately affect burnout, and the results showed that compassion satisfaction, secondary traumatic stress, and resilience had an association: less resilience increased burnout severity. A study of EPs that was conducted before the COVID-19 pandemic showed that less burnout and high resilience could reduce intentions to leave their job.<sup>30</sup> There are no data on burnout or resilience among Korean EPs from before the COVID-19 pandemic; however, the burnout possibly worsened because of low resilience. Therefore, severe burnout can be prevented by enhancing and maintaining resilience of EPs. In the United States, the levels of stress and anxiety of the EPs and nurses decreased as they gained more experience with COVID-19 and further sought hospital and department leadership for their wellness.<sup>24</sup> Leadership, support, and education programs are needed at the hospital or at emergency medicine level to promote resilience during the pandemic. In this regard, Monette, et al.<sup>31</sup> reported that a video-based debriefing program focusing on empathy and normalizing reactions to support emergency medicine specialist and residents was useful to support them.

A few limitations to this study must be considered. First, there may be a social desirability bias or acquiescence bias that may have occurred in the survey. To mitigate this limitation, DAS was included in the survey. As a result, while there was no difference in burnout and resilience between sexes, female participants had more positive self-image and emotional content. Second, as the participants were EPs from university teaching hospitals, the quality of life and resilience of EPs in non-university non-teaching hospitals remain unknown. The response rate to survey in this study was at 40%, indicating that participants might have faced a heavy workload and less likely to respond to the survey, leading to selection bias. Third, the emer-

gency department is composed of different professionals and doctors, but only EPs in university teaching hospitals were included. Investigation for all emergency department health-care providers is needed in the near future. Finally, as this was a cross-sectional study, we were unable to analyze trends for COVID-19 in relation to the variables that were studied. In the future, EPs working in non-university non-teaching hospitals, and longitudinal investigations are required to address the abovementioned limitations.

High level resilience may be protective against burnout among EP. In this study, residents and a subgroup of participants who had personal experiences with COVID-19 had lower resilience than their counterparts. It is uncertain when the COVID-19 pandemic will end, and EPs who have had personal experiences related to COVID-19 are expected to attend to their duties in the emergency room. Therefore, supportive measures, including interventions for improving resilience and prevention of burnout, such as mental health support, is necessary. The leaders of emergency medicine departments and medical institutions may be able to address this concern by paying attention to individuals with poor resilience and severe burnout.

## ACKNOWLEDGEMENTS

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. 2020R1F1A1057947).

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