RESEARCH ARTICLE

Examining the Secondary Traumatic Stress Levels of Emergency Service Healthcare Workers in Contact and Non-Contact with Covid-19 Pandemic Patients

Ömer Karaman[1](ID), Atakan Savrun[2](ID), Yeliz Kaşko Arıcı[3](ID)

[1]Ordu University, Faculty of Education, Department of Educational Sciences, Psychological Counseling and Guidance, Turkey
[2]Sincan Training and Research Hospital Emergency Medicine Department, Ankara, Turkey
[3]Ordu University, Faculty of Medicine, Department of Biostatistics and Medical Informatics,

Abstract

Objective: The fight against the Covid-19 pandemic has not only been limited to physical risks but has also led to profound psychological impacts. Secondary traumatic stress (STS) is an important concept reflecting the effects of traumatic experiences frequently encountered by healthcare workers. This study aims to investigate the levels of STS experienced by emergency department healthcare workers during the Covid-19 pandemic. The research aims to provide insights into the impact on the mental health of healthcare workers during and after the Covid-19 pandemic. Furthermore, the analysis of the data obtained will yield important conclusions for understanding the long-term effects of the pandemic and preparing healthcare systems for such crises.

Methods: The study population consisted of doctors, nurses, and other healthcare personnel (health officers, midwives, technicians, paramedics, aides, etc.) working in emergency departments. The study covered 239 participants from various provinces within the authors' network.

Results: The study found no significant variation in STS based on whether participants lived in a major city or not. However, significant differences were identified based on gender. Additionally, significant differences were observed in the "avoidance", "arousal" subscales, and total score of STS based on the job categories of emergency department staff. Furthermore, STS scores varied significantly based on years of service among emergency department staff. Moreover, the study identified significant differences in STS scores based on the frequency of encounters with Covid-19 patients during the pandemic.

Conclusion: According to the data obtained, factors such as gender, years of service, and professional experience need to be considered to support the mental health of emergency department staff. It is also important to develop support programs and coping strategies specifically for female employees. Moreover, in extraordinary situations like the Covid-19 pandemic, it is essential to strengthen coping strategies for traumatic experiences among emergency department staff and facilitate access to supportive resources. This approach can ensure the sustainability of healthcare services and preserve the health and well-being of emergency department staff.

Keyword: Covid-19 pandemic, healthcare worker, secondary stress level.

Address for correspondence/reprints:

Ömer Karaman

Telephone number: +90 (505) 648 71 89

E-mail: okaraman44@hotmail.com

INTRODUCTION

The Covid-19 pandemic has posed a formidable challenge to healthcare systems and professionals worldwide. Emergency healthcare workers, in particular, have been at the forefront of this pandemic, continuously battling for the diagnosis and treatment of patients (1,2). However, this struggle has not been limited to physical risks alone; it has also led to profound psychological effects.

Secondary traumatic stress is a type of stress experienced by individuals who empathize with and internalize the suffering of those who have experienced traumatic events, even if they have not directly experienced trauma themselves (3,4). The level of secondary traumatic stress reflects the impacts of traumatic experiences frequently encountered by healthcare workers due to the nature of their profession (5). This stress is experienced by witnessing patients' suffering or internalizing what they have experienced. Particularly for professionals like emergency healthcare workers who are constantly exposed to traumatic cases, secondary traumatic stress can have serious effects on both their occupational risks and mental health.

Therefore, investigating the level of secondary traumatic stress is a crucial step in understanding the psychological needs of healthcare workers and providing appropriate support mechanisms (6-10). This study aims to explore the level of secondary traumatic stress experienced by emergency healthcare workers during the Covid-19 pandemic. Specifically, it aims to compare the levels of secondary traumatic stress between healthcare workers who have and have not been in contact with pandemic patients. Understanding how emergency healthcare workers cope with this type of stress is essential for developing measures to safeguard their mental health and enhance service quality.

By addressing gaps in the research literature, this study aims to provide insights into the impact on the mental health of healthcare workers during and after the Covid-19 pandemic. Furthermore, the analysis of the data obtained will provide important findings for understanding the long-term effects of the

pandemic and preparing healthcare systems for such crises.

METHODS

Study design, Participants and Data Collection

ChatGPT

The study population consisted of doctors, nurses, and other healthcare personnel (health officers, midwives, technicians, assistants, etc.) working in the emergency department. A web-based cross-sectional survey was conducted between May 19th and August 8th, 2020, during the global COVID-19 pandemic. Data for the study were collected from responses to questionnaires prepared in Google Forms. The study included 239 participants from various provinces within the authors' network.

Data collection tools in the study included a "Personal Information Form" consisting of 10 demographic and descriptive questions designed according to the research hypotheses, as well as the "Secondary Traumatic Stress Scale (STSS)." The Turkish adaptation of the STSS, developed by Yıldırım, Kıdak, and Yurdabakan (12), is based on the scale originally developed by Bride et al. (11). This scale, comprising 17 items rated on a five-point Likert scale (Never (1), Rarely (2), Sometimes (3), Often (4), and Very often (5)), is designed to measure the level of secondary traumatic stress developed by healthcare professionals working with traumatized individuals. Possible scores on the scale range from 17 to 85, with higher scores indicating higher levels of impact. The scale includes three subscales named "emotional intrusion," "avoidance," and "arousal." Items 2, 3, 6, 10, and 13 assess emotional intrusion symptoms, items 1, 5, 7, 9, 12, 14, and 17 assess avoidance symptoms, and items 4, 8, 11, 15, and 16 assess arousal symptoms. The internal consistency reliability coefficient (Cronbach's alpha) for the scale was found to be 0.91, and for the emotional intrusion, avoidance, and arousal subscales, the calculated internal consistency coefficients were 0.84, 0.78, and 0.82, respectively (Yıldırım et al., 2018).

Statistical analysis

All statistical analyses were performed using SPSS v26 (IBM Inc., Chicago, IL, USA) software. The assumption of homogeneity of variances was checked using Levene's test. When this assumption was met, Student's t-test or one-way ANOVA was used to compare independent groups; otherwise, Welch's t-test or Welch's ANOVA was used. Tukey's multiple comparison test was used to determine differences between groups after ANOVA, while Games-Howell's multiple comparison test was used after Welch's ANOVA. All comparisons were two-tailed, and a p-value less than 0.05 was considered statistically significant.

RESULTS

Total of 239 individuals participated in the study, comprising 46.9% males and 53.1% females. Of the participants, 51.9% were doctors, 38.1% were nurses, and 10.0% held other positions (health officers, midwives, technicians, assistants, etc.). Regarding the age distribution, 38.9% of participants were in the 18-30 age range, 41.8% were in the 31-40 age range, 15.1% were in the 41-50 age range, and 4.2% were in the 51-64 age range. Additionally, it was determined that 77.4% of the participants resided in major cities (Table 1).

The distribution of participants' use of cigarettes, alcohol, and sedative medications, the distribution of their working hours during the COVID-19 pandemic and encounters with infected patients, and the frequencies and percentages of the responses to the questions asked in the STSS survey are provided in Tables 2-4.

Table 1. Frequencies and percentages of participant characteristics

		n	%
Gender	Male	112	46.9
	Female	127	53.1
Age	18-30	93	38.9
	31-40	100	41.8
	41-50	36	15.1
	51-64	10	4.2
Is the city you live in a metropolitan city?	Yes	185	77.4
	No	54	22.6
Working period (years)	1-5	84	35.1
	11-15	47	19.7
	15 ↑	57	23.8
	6-10	51	21.3
Colleague	Doctor	124	51.9
	Nurse	91	38.1
	Orher	24	10.0

Table 2. Frequencies and percentages of the participant about smoking, alcohol and sedating medication uses.

	Never		Rarely		Often	
	n	%	n	%	n	%
Do you use medical or paramedical sedatives or relaxants?	211	88.3	18	7.5	10	4.2
Do you consume alcohol?	151	63.2	67	28.0	21	8.8
Do you smoke?	125	52.3	48	20.1	66	27.6

Table 3. Frequencies and percentages of the participant about Covid-19……………..

		n	%
What was the frequency of encountering daily Covid-19 patients during the pandemic period you worked?	Never	8	3.3
	Rarely	50	20.9
	Mostly	131	54.8
	Always	50	20.9
What was your monthly working hours during the Covid-19 pandemic?	Normal mesai süresi	90	37.7
	Normal mesai süresinden az (esnek mesai)	80	33.5
	Normal mesai süresinden fazla	69	28.9

Table 4. Frequencies and percentages of STSS

	Never		Very little		Sametimes		Often		Very styliish		$\bar{X}$	S_X
	n	%	n	%	n	%	n	%	n	%		
1. I felt emotionally numb.	56	23.4	51	21.3	80	33.5	40	16.7	12	5.0	2.6	1.2
2. My heart started racing when I thought about my sessions with clients..	117	49.0	53	22.2	41	17.2	26	10.9	2	0.8	1.9	1.1
3. I felt as if I was reliving the trauma experienced by my client(s)	127	53.1	48	20.1	40	16.7	21	8.8	3	1.3	1.8	1.1
4. I had difficulty sleeping	71	29.7	47	19.7	52	21.8	38	15.9	31	13.0	2.6	1.4
5. I felt hopeless about the future.	56	23.4	50	20.9	62	25.9	35	14.6	36	15.1	2.8	1.4
6. Reminders of my sessions with clients saddened me.	85	35.6	63	26.4	53	22.2	31	13.0	7	2.9	2.2	1.1
7. I had reduced desire to be around others in social settings.	38	15.9	54	22.6	59	24.7	45	18.8	43	18.0	3.0	1.3
8. I felt nervous.	41	17.2	52	21.8	44	18.4	69	28.9	33	13.8	3.0	1.3
9. I was less active than usual.	52	21.8	41	17.2	53	22.2	55	23.0	38	15.9	2.9	1.4
10. I found myself thinking about my sessions with clients involuntarily, even when I didn't intend to.	71	29.7	60	25.1	66	27.6	31	13.0	11	4.6	2.4	1.2
11. I had difficulty concentrating.	66	27.6	59	24.7	62	25.9	41	17.2	11	4.6	2.5	1.2
12. I avoided people, places, or things that reminded me of my sessions with clients.	105	43.9	56	23.4	44	18.4	28	11.7	6	2.5	2.1	1.1
13. I wanted to avoid working with my clients.	137	57.3	42	17.6	38	15.9	16	6.7	6	2.5	1.8	1.1
14. I wanted to avoid working with some of my clients.	95	39.7	54	22.6	49	20.5	27	11.3	14	5.9	2.2	1.2
15. I became easily fatigued.	52	21.8	47	19.7	64	26.8	44	18.4	32	13.4	2.8	1.3
16. I felt like something bad was going to happen.	60	25.1	53	22.2	52	21.8	47	19.7	27	11.3	2.7	1.3
17. I noticed gaps in my memory regarding my sessions with clients.	95	39.7	54	22.6	59	24.7	23	9.6	8	3.3	2.1	1.1

Table 5. Descriptive statistics of STSS

	Items	n	Minimum	Maximum	Mean	SD	Cronbach's Alpha
Intrusion	2, 3, 6, 10, 13	239	5.0	25.0	10.16	4.66	0.894
Avoidance	1, 5, 7, 9, 12, 14, 17	239	7.0	35.0	17.71	6.72	0.881
Arousal	4, 8, 11, 15, 16	239	5.0	25.0	13.62	5.61	0.906
STSS-Total	1-17	239	17.0	85.0	41.48	16.18	0.957

Table 6. Descriptive statistics of STSS according to gender and living in a big city or not

	Is the city you live in a metropolitan city?							
	Yes			**No**			**t**	**p**
	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X		
Intrusion	185	10.27	4.60	54	9.78	4.90	0.682[a]	0.496
Avoidance	185	17.85	6.64	54	17.20	7.04	0.605[b]	0.547
Arousal	185	13.81	5.69	54	12.96	5.33	0.970[a]	0.333
STSS-Total	185	41.93	16.10	54	39.94	16.51	0.793[a]	0.429
	Gender							
	Male			**Female**			**t**	**p**
	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X		
Intrusion	112	8.92	3.80	127	11.25	5.07	-4.049[b]	<0.001
Avoidance	112	16.17	5.80	127	19.06	7.19	-3.439[b]	<0.001
Arousal	112	12.03	5.05	127	15.02	5.73	-4.253[a]	<0.001
STSS-Total	112	37.12	13.67	127	45.33	17.27	-4.099[b]	<0.001

[a]: Student t-test
[b]: Welch's t-test

Table 7. Descriptive statistics of STSS according to job

		Doctor			Nurse			Other		F	p
	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X		
Intrusion	124	10.00	4.54	91	10.78	4.91	24	8.63	4.01	2.202	0.113
Avoidance	124	18.23 [a]	6.41	91	18.09 [a]	6.93	24	13.58 [b]	6.31	5.211	0.006**
Arousal	124	13.88 [a]	5.34	91	14.07 [a]	5.92	24	10.54 [b]	5.04	4.134	0.017*
STSS-Total	124	42.10 [a]	15.32	91	42.93 [a]	17.10	24	32.75 [b]	14.84	4.053	0.019*

F: One-way ANOVA
*:<0.05, **:<0.01
Means that do not share a common letter are significantly different at p<0.05

Table 8. Descriptive statistics of STSS according to working period

	Working period (years)													
	1-5			6-10			11-15			15↑			F	p
	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X		
Intrusion	84	10.26 [a]	4.62	51	11.67 [a]	4.99	47	10.57 [a]	5.11	57	8.32 [b]	3.37	6.633+	<0.001
Avoidance	84	18.73 [a]	6.32	51	20.33 [a]	6.53	47	17.40 [a]	7.11	57	14.11 [b]	5.67	9.683	<0.001
Arousal	84	14.82 [a]	5.18	51	15.53 [a]	5.88	47	13.30 [a]	5.70	57	10.39 [b]	4.50	10.795	<0.001
STSS-Total	84	43.81 [a]	15.04	51	47.53 [a]	16.56	47	41.28 [a]	17.26	57	32.81 [b]	13.04	9.296	<0.001

F: One-way ANOVA
F+: One-way ANOVA
Means that do not share a common letter are significantly different at p<0.05

Table 9. Descriptive statistics of STSS according to length of service

		Never			Rarely			Often		F	p
	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X	n	$\bar{X}$	S_X		
Medical or paramedical use of sedative or relaxant substances											
Intrusion	211	9.95	4.68	18	11.89	3.85	10	11.40	5.27	1.813	0.165
Avoidance	211	17.42	6.78	18	19.72	5.96	10	20.10	6.23	1.642	0.196
Arousal	211	13.31	5.63	18	15.67	4.89	10	16.30	5.56	2.690	0.070
STSS-Total	211	40.69	16.32	18	47.28	13.66	10	47.80	15.14	2.193	0.114
Alcohol use status											
Intrusion	151	10.09	4.78	67	10.30	4.53	21	10.24	4.39	0.051	0.950
Avoidance	151	17.42	6.70	67	17.97	7.08	21	18.90	5.73	0.517	0.597
Arousal	151	13.44	5.51	67	13.70	6.02	21	14.57	5.19	0.381	0.684
STSS-Total	151	40.95	16.16	67	41.97	17.06	21	43.71	13.72	0.309	0.735
Smoking Status											
Intrusion	125	10.13	4.65	48	11.02	4.56	66	9.59	4.73	1.317	0.270
Avoidance	125	17.54	6.76	48	19.27	6.59	66	16.88	6.66	1.850	0.159
Arousal	125	13.62	5.52	48	14.42	5.90	66	13.03	5.59	0.847	0.430
STSS-Total	125	41.29	16.19	48	44.71	16.15	66	39.50	16.08	1.464	0.233

F: One-way ANOVA

Table 10. The variation based on responses to the question 'What was the frequency of encountering daily Covid-19 patients during the pandemic period you worked?' in relation to STSS

	Never			Rarely			Mostly			Always			F[+]	p
	n	$\overline{X}$	S_X	n	$\overline{X}$	S_X	n	$\overline{X}$	S_X	n	$\overline{X}$	S_X		
Intrusion	8	6.38 [b]	2.07	50	9.50 [a]	3.86	131	11.04 [a]	4.77	50	9.12 [a]	4.87	10.254	<0.001
Avoidance	8	9.50 [c]	2.73	50	16.22 [b]	5.85	131	19.34 [a]	6.20	50	16.24 [b]	7.71	25.761	<0.001
Arousal	8	7.00 [c]	2.27	50	11.54 [b]	4.97	131	15.33 [a]	5.01	50	12.26 [b]	6.32	28.732	<0.001
STSS-Total	8	22.88 [c]	6.42	50	37.26 [b]	14.08	131	45.70 [a]	14.98	50	37.62 [b]	18.30	25.017	<0.001

F[+]: Welch's ANOVA
Means that do not share a common letter are significantly different at p<0.05

Table 11. The variation based on responses to the question 'What was your monthly working hours during the Covid-19 pandemic?' in relation to STSS.

	Normal working hours			Less than normal working hours (flexible working hours)			More than normal working hours			F	p
	n	$\overline{X}$	S_X	n	$\overline{X}$	S_X	n	$\overline{X}$	S_X		
Intrusion	90	10.89	4.99	80	9.89	4.53	69	9.52	4.29	1.898	0.152
Avoidance	90	18.86	6.52	80	17.26	7.00	69	16.72	6.53	2.249	0.108
Arousal	90	14.56	5.39	80	13.43	5.90	69	12.61	5.45	2.448	0.089
STSS-Total	90	44.30	15.96	80	40.58	16.70	69	38.86	15.51	2.428	0.090

F: One-way ANOVA

The Cronbach's alpha coefficient of this scale and all dimensions is 0.88–0.96, with good reliability (Table 5).

Neither the total nor the sub-dimension scores of the STSS showed significant differences based on whether the city of residence was a major city or not (p>0.05). However, a significant difference was observed in STSS scores based on gender, with women having higher averages in both the total and sub-dimension scores (p<0.001) (Table 6).

The 'Intrusion' sub-dimension of the STSS did not differ significantly according to the task groups of the participants (p>0.05). However, the 'Avoidance' and 'Arousal' sub-dimensions and the total score of the scale showed

significant differences according to the task groups of emergency service workers (p<0.01, p<0.05, p<0.05, respectively). While there was no significant difference in the 'Avoidance', 'Arousal', and 'Total' scores between doctors and nurses working in emergency services (p>0.05), the 'Avoidance', 'Arousal', and 'Total' scores of other emergency service workers were statistically significantly lower than those of both doctors and nurses (p<0.05) (Table 7).

STSS scores showed significant differences according to the years of service of emergency service workers (p<0.001) (Table 8). While there was no significant difference among those with years of service of '1-5 years,' '6-10 years,' and '11-15 years' (p>0.05), the scores of those

with '15 years and over' of service were significantly lower (p<0.05).

STSS scores did not show significant differences based on the use of medical or paramedical sedatives or relaxants, alcohol, and smoking among emergency service workers (p>0.05) (Table 9).

Significant differences were found in STSS scores based on the responses of emergency service workers to the question, 'How often do you encounter COVID-19 patients on the days you work during the pandemic?' (p<0.001) (Table 10). The 'Intrusion' sub-dimension of the scale was found to be significantly lower among those who never encountered COVID-19 patients compared to those who did encounter them daily (p<0.05). There was no significant difference between those who encountered COVID-19 patients daily and those who answered 'rarely,' 'mostly,' and 'always' (p>0.05). For the 'Avoidance' sub-dimension, those who encountered COVID-19 patients daily had significantly lower scores compared to those who never encountered them (p<0.05). While there was no significant difference between those who encountered COVID-19 patients 'rarely' and 'always' (p>0.05), the 'Avoidance' scores were significantly higher among those who answered 'mostly' (p<0.05). The same pattern was observed for both the 'Arousal' sub-dimension and the total score of the scale.

STSS scores did not show significant differences based on the responses of emergency service workers to the question, 'What is your monthly working hours during the COVID-19 pandemic?' (p>0.05) (Table 11).

DISCUSSION

In the study, neither the total nor the sub-dimensions of the STSS showed significant changes based on whether the city of residence was a large city or not. However, it was determined that the STSS significantly varied by gender. It was found that women had higher averages in both the total and sub-dimensions. This suggests that the size of the city is not a determining factor for secondary traumatic stress levels among healthcare workers. In the study, women had higher averages in both total STSS scores and sub-dimensions. This finding can be interpreted as female healthcare workers experiencing secondary traumatic stress more intensely than their male colleagues. Similarly, Derya et al. (10) found a significant relationship between gender and STSS. Orrù et al. also found that STSS scores were higher in women than in men (13). Other studies have yielded similar results (14, 15). However, Ilhan and Küpeli (9) did not find a difference between gender and STSS.

In the study, the 'Avoidance' and 'Arousal' sub-dimensions and total scores of the scale showed significant differences according to the task groups of emergency service workers. While there was no significant difference between the

'Arousal', 'Avoidance', and 'Total' scores of doctors and nurses, it was observed that the 'Avoidance', 'Arousal', and 'Total' scores of other emergency service workers were statistically significantly lower than those of both doctors and nurses. These findings demonstrate differences in secondary traumatic stress levels among emergency service workers according to their task groups. While no significant difference was found between doctors and nurses, other emergency service workers were found to have lower levels of these stress symptoms. This may suggest that the different tasks of emergency service workers affect their levels of secondary traumatic stress and that these professional groups may have different coping mechanisms. In similar studies, Salameh et al. found higher percentages of STSS in nurses (16). Other studies have also yielded similar results (4, 7, 14, 17). No studies were found in the literature comparing the sub-dimensions of the STSS scale used in this study.

In the study, STSS scores showed significant differences according to the years of service of emergency service workers. However, no significant difference was found among those with '1-5 years', '6-10 years', and '11-15 years' of service, while the scores of those with '15 years and over' were found to be significantly lower. This can be explained by the fact that those who have worked in the emergency environment for many years' experiences less

secondary traumatic stress. The results suggest that the professional experience of emergency service workers may have a significant impact on secondary traumatic stress. Long-term service may allow emergency service workers to develop coping mechanisms for occupational stress and better adapt to traumatic experiences. From another perspective, the professional experience of emergency service workers can be considered an important factor in supporting the sustainability of healthcare services.

In the study, significant differences were found in STSS scores based on the responses of emergency service workers to the question, 'How often do you encounter COVID-19 patients on the days you work during the pandemic?'. The 'Intrusion' sub-dimension of the scale was found to be significantly lower among those who never encountered COVID-19 patients compared to those who encountered them daily. No significant difference was found between those who encountered COVID-19 patients daily and those who answered 'rarely,' 'mostly,' and 'always'. However, the 'Avoidance' sub-dimension was found to be significantly lower among those who never encountered COVID-19 patients. The 'Avoidance' scores were found to be significantly higher among those who answered 'mostly'. The same pattern was observed for both the 'Arousal' sub-dimension and the total score of the scale. The 'Intrusion' sub-dimension of the STSS scale was found to be

significantly lower among emergency service workers who never encountered COVID-19 patients daily. This can be interpreted as those who did not have contact with COVID-19 patients experiencing fewer symptoms of intrusion caused by such traumatic experiences. The lack of significant differences in the 'Intrusion', 'Avoidance', and 'Arousal' sub-dimensions and the total score between those who encountered COVID-19 patients 'rarely', 'mostly', and 'always' suggests that the frequency of encountering COVID-19 patients does not affect the secondary traumatic stress levels of emergency service workers. However, a significant difference was found in the 'Avoidance' sub-dimension between those who never encountered COVID-19 patients and those who mostly encountered them. Additionally, the 'Avoidance' sub-dimension scores were found to be higher among emergency service workers who mostly encountered COVID-19 patients. This indicates that the frequency of encountering COVID-19 patients daily has a significant impact on avoidance and arousal symptoms. The traumatic experiences faced by workers during the COVID-19 pandemic may have influenced their stress symptoms and caused functional impairments.

CONCLUSION

The study found that gender, years of service, task groups, and the frequency of encountering COVID-19 patients daily had a significant impact on STSS scores. Women generally had higher STSS scores, with a notable difference in the 'Avoidance' sub-dimension. Additionally, those with long-term service and those who did not encounter COVID-19 patients daily had lower STSS scores.

In this context, it is important to consider factors such as gender, years of service, and professional experience to support the mental health of emergency service workers. Developing support programs and stress management strategies for female workers is crucial. Furthermore, training and guidance programs to enhance the coping skills of new emergency service workers should be established. Given the impact of daily encounters with COVID-19 patients on STSS levels during the pandemic, providing psychosocial support to healthcare workers during such periods is essential. Strengthening coping strategies and facilitating access to supportive resources for emergency service workers in extraordinary situations like the COVID-19 pandemic will help maintain the sustainability of healthcare services and protect the health and well-being of emergency service workers.

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