**REVIEW PAPER** 

## WORK IN STRESSFUL CONDITIONS IN MEDICAL EMERGENCY SYSTEM DURING THE COVID-19 PANDEMIC

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#### ABSTRACT

The pandemic caused a change in the way of providing healthcare services, limiting direct access to doctors, suspending planned treatments and medical consultations, but despite the risks and restrictions, the medical rescue system as a key element of health care for the society continues to function. The system provides medical assistance to patients in the most severe condition, both with a negative result for SARS-CoV-2, as well as with a positive or undiagnosed result. It is a review aimed at analyzing the most important psychological aspects of the work of emergency medical care system personnel during the COVID-19 pandemic. PubMed, Cochrane Library, and Google Scholar search were used to analyze the problem. The following keywords were used to search for information sources: paramedic, work, emergency medical care system, emergency department, ambulance service, COVID-19, pandemic, SARS-CoV-2, coronavirus. The articles were selected in terms of the psychological aspects of the work of the emergency medical care system personnel during the to the fore during a pandemic include system personnel levels of stress, anxiety, depression, burnout, emotional exhaustion, vicarious traumatization, and post-traumatic stress disorder. In the context of the increased risk of psychological support for the entire team and individually. Med Pr. 2022;73(3):241–50

Key words: COVID-19, pandemic, stress, emergency medical care system, paramedic, work conditions

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### INTRODUCTION

Due to the mass appearance of SARS-CoV-2 infections all over the world and then in Poland, on March 20, 2020 an epidemic was declared in the territory of the Republic of Poland [1]. The epidemiological threat caused a change in the implementation of medical services, limitation in direct access to doctors, and suspension of planned procedures and medical consultations. However, despite the risks and restrictions, the medical rescue system as a key element of health protection in society had to continue to function, identifying infected patients and providing medical assistance to patients in the most severe condition, both with a negative result for SARS-CoV-2, as well as with a positive or undiagnosed result.

Due to the emergence of a pathogen that could threaten the safety of the entire society, the health care sector has become a key element in ensuring the safety of citizens, and medical workers, in particular those working in pulmonary, infectious and emergency departments, in intensive care units and emergency services, have become frontline employees in the fight with COVID-19. The biological hazard caused by the SARS-CoV-2 virus was especially severe among the personnel of the emergency medical system, in particular those working in the ambulance service and hospital emergency departments, where most patients are diagnosed for SARS-CoV-2 virus infection. While the pandemic has affected all groups of healthcare professionals, the context of providing emergency care to COVID-19 patients is nowhere more obvious than in the practice of emergency medical care staff [2].

It should be noted that all patients with fever and any symptoms of a respiratory infection should be considered COVID-19 until proven otherwise, so paramedics

Funding: this study was supported by Nicolaus Copernicus University in Toruń, Collegium Medicum in Bydgoszcz (subsidy No. 976/2014-2021).

should wear personal protective equipment (PPE). Personal protective equipment consists of many elements such as gloves, gowns, surgical face masks, safety glasses and face shields and putting it on takes precious time [3]. In their daily work, employees of the emergency medical care system come into contact with people potentially infected with COVID-19 who require help from ambulance services or emergency departments, and wearing PPE for many hours reduces the comfort of work, especially in the ambulance service practice, where there are many distractors, such as unpredictable and uncontrolled weather conditions at the scene or at the patient's home, a small amount of space in the ambulance or the need to perform medical procedures while driving. Most Polish ambulances do not have a separate compartment for the driver, therefore all personnel are required to wear personal protective equipment, including the driver. Personal protective equipment can limit the field of view, range of motion, and when used inappropriately, it can also evaporate and limit not only the comfort of work, but also endangers the road safety while driving an emergency vehicle. There is increasing number of research about psychological aspects of the work of medical staff working during the COVID-19 pandemic however there is still lack of studies particularly among the emergency medical care services employees. The aim of the review is to identify the psychological aspects of the work of the emergency medical care system personnel during the pandemic.

#### METHODS

PubMed, Cochrane Library, and Google Scholar search were used to analyze the problem. The following keywords were used to search for information sources: paramedic, work, health care system, emergency medical care system, hospital emergency department, ambulance service, COVID-19, pandemic, SARS-CoV-2, coronavirus in various combinations in Polish and English. The articles were selected in terms of the psychological aspects of the work of the emergency medical care system personnel during the pandemic in 2020– 2021. Fourty nine articles met the inclusion criteria.

#### RESULTS

### Working conditions in the emergency medical care system

Pursuant to the Act on the State Medical Rescue, the mission of rescue is to undertake rescue actions for every person in a state of threat to life or health [4]. By definition, the system should deal with saving health and life, regardless of the introduction of emergency or epidemic conditions. Due to the specificity of the work of paramedics, nurses and doctors working in the emergency medical system, they must be prepared to work in all conditions, regardless of factors that may cause accidents, physical, biological, chemical, ergonomic, psychosocial and organizational factors [5]. In 2020, biological agents, in the form of the SARS-CoV-2 virus, became one of the most important threats to public health in Poland, and employees of the emergency medical system who have regular direct contact with patients became particularly exposed to the risk of developing COVID-19.

The safety of the rescuer should always be important, however, the cessation of the emergency medical care system would compromise the safety of citizens. Paramedics are people oriented towards social professions who assess their work as requiring adaptability, the ability to work under high pressure and the ability to cope with stress [6]. Choosing to work in medical rescue teams or hospital emergency departments is associated with difficult, unpredictable situations inherent in the characteristics of work, and people choosing this profession are aware of the burdens and associated risks. As a consequence of the pandemic, the work conditions of paramedics and their daily duties have changed [7].

Ambulance personnel in Poland, apart from more strict equipment disinfection procedures, the need to adapt to organizational changes in the health care system and changes in collecting medical history by increasing the emphasis on infectious symptoms, was also burdened with performing diagnostic tests for the SARS-CoV-2 virus. Medical personnel also indicates limited contact with the patient resulting from the use of personal protective equipment that covers most of the face, and as a result of the increased workload, the staff has less time to maintain contact with patient [8]. Contact with the patient both at the scene, in the ambulance and in the emergency department is particularly important from the perspective of the correct and complete collection of medical history in order to make a diagnosis and implement appropriate treatment as early as possible. Difficult eye contact and covering the mouth can increase the stress level during patient diagnosis because of difficulty to hear and observe patient's reactions during physical examination.

What is important, the increased number of procedures in ambulances and organizational changes regarding the transfer of patients to hospitals during the second wave of the pandemic in Poland led to longer waiting times for an ambulance. At the Berlin 112 headquarters, the duration of emergency calls has been extended by an average of 1 min 36 s due to additional questions in the pandemic protocol [9]. At the individual level, medical dispatchers must make decisions in line with frequently changing guidelines. For example, deciding the order of disposing of ambulances to patients as a result of deficits of free teams caused by long waiting hours in emergency departments, or sending ambulances with patients to distant hospitals as a result of transforming the nearest hospitals into COVID-19 hospitals. Most of these decisions are already regulated by relevant regulations, but they differ from the usual pre-COVID-19 practice and guidelines [8].

Research among the Australian community (N = 41)[10] shows a strong belief that paramedics also have a right to a safe work environment. However, this rights are questioned in relation to the risks associated with viruses such as the SARS-CoV-2 coronavirus [10]. The risk of COVID-19 infection depends on frequent close physical contact with people potentially infected with COVID-19 and contact with contaminated surfaces and objects, and is therefore high among healthcare professionals [11] in particular, the personnel of the emergency medical care system providing immediate aid to people not yet diagnosed with SARS-CoV-2. In some cases helping the patient within the system requires immediate action, and the time to perform the test and receive the result would extend the waiting time for help and, as a result, could deteriorate the patient's health.

In order to reduce the risk of infection among medical personnel and paralysis of system units during a pandemic, special solutions have been introduced. The rotational system of work, extension of duty hours, isolation of the "clean" zone from the "dirty" zone or limitation of the number of jobs among medical staff, on the one hand, was to protect system employees against infection [12], but at the same time it increases the arduousness of work and affects the psychosocial working conditions as a result of increased mental and physical burden. During the pandemic, employees of the emergency medical care system had to treat both patients with positive results for the presence of SARS-CoV-2 and patients in health or life-threatening conditions not resulting from coronavirus infection.

Shortages of medical personnel due to quarantines and isolations, referrals to work to other positions or in other medical facilities, changes in the scope of duties and patient profile, lack of theoretical and practical preparation for work in pandemic conditions, frequently changing guidelines and legal regulations, inconvenience of using measures PPE affected the working conditions of medical personnel during the pandemic. Scientific research shows the emergence of negative psychological effects among healthcare professionals working during a pandemic, such as burnout, anxiety, depression or even post-traumatic stress disorder (PTSD) [8].

# Stress among healthcare professionals during the COVID-19 pandemic

Even before the pandemic, the results of studies indicated the presence of an increased level of stress among employees of emergency departments. The studies assessed that the level of fatigue at work was most often influenced by the patient's demanding and "pretentious" attitude, unfriendly atmosphere at work and aggressive patients. Nurses experienced the highest exposure to stress during work, while doctors presented the lowest. Paramedics showed an average level of stress [13], which may be caused by constant exposure to various stress factors resulting from the work conditions. It can be observed that the COVID-19 pandemic has caused an evident increase in exposure to stress among medical personnel, who in everyday practice are exposed to contact with pathogens.

Nearly half of emergency nurses in Turkey [14] experienced above average stress during the pandemic. Studies on the population of Polish paramedics, nurses and doctors (N = 955) [15] showed an increased level of occupational stress of emergency medical care services, caused by coping with a previously unknown situation, which is the COVID-19 pandemic. It was assessed that the fear of becoming infected with COVID-19, a decrease in the level of occupational safety while performing professional duties and the marginalization of patients with diagnoses other than COVID-19 are predictors of occupational stress among medical workers. Women are particularly exposed to stress. Training needs, the provision of personal protective equipment and the assurances about the health care system's readiness to deal with the pandemic did not affect the level of stress of medical personnel [15].

Research in emergency departments in China [16] found that staff with fewer breaks and more night shifts each week had higher levels of anxiety and stress. The length of rest time and the number of night shifts may reflect whether emergency department resources are sufficient and it should be noted that more night shifts were risk factors for perceived stress. Hospitals should provide an adequate number of nurses for emergency departments, reducing the number of night shifts and providing adequate rest time to protect staff from the negative effects of stress [16]. The same recommendations should apply to ambulance personnel where Polish decision-makers introduced a 2-shift system. This is an extremely difficult task at a time when limited medical personnel is essential in every field of fighting a pandemic. Australian study indicates that the major source of stress for paramedics were changing information and organizational procedures. Keeping up to date with the procedures was extremely difficult due to their frequent and quick changes The inconsistency between the procedures related to COVID-19 prophylaxis and infected patients management made it difficult to transfer patients between different health services [17].

# Experiencing anxiety, depression and burnout as a result of a pandemic

A new unknown virus caused anxiety symptoms among the public, especially during the first wave at the turn of 2019 and 2020. Research conducted during the pandemic showed that healthcare professionals also feared for themselves and their loved ones in the context of an increased risk of infection. The possibility of infecting oneself or one's relatives is one of the factors influencing the level of anxiety among healthcare workers [18].

The concerns of medical staff during the pandemic were caused not only by the fear of getting sick, but also by the fear of completely different working conditions and the fear of adapting to new conditions with limited information and training support in the new workplace. In online research on the impact of the pandemic on the work environment of healthcare workers (N = 921), 86% of respondents reported feeling stressed by changes in the work environment and viral transmission. It was indicated that the level of perceived stress depended on the availability of personal protective equipment and resources related to mental health as well as received social support [19].

Dahmen et al. [9] showed that the low level of experience of the group of emergency medical doctors working during the COVID-9 pandemic turned out to have an impact also on the occurrence of occupational burnout. Research conducted by Conti et al. [20] showed also that during the pandemic, female healthcare professionals experienced higher levels of anxiety and somatization than male staff, and higher levels of somatization, depression, anxiety and post-traumatic symptoms also occurred in people <40 years old, which may be related with lower medical experience in the group of younger people. It should be noted that working in the "red zone" with COVID-19 patients had a smaller impact on the mental state of employees than working in areas not intended for patients with a positive SARS-CoV-2 result [20], which may be associated with exposure to numerous stressors related to, for example, the treatment of patients in serious medical condition, in emergencies or after accidents, as well as the need to make quick decisions regarding diagnostic procedures and medical rescue activities even before the pandemic. Lu et al.'s research [21] has confirmed that during the ongoing COVID-19 pandemic, the prevalence of anxiety and stress disorders among healthcare professionals is high.

Emerging new outbreaks of infectious diseases cause a strong stress response in medical personnel, especially those working on the front lines with infected patients. People providing health services during the COVID-19 pandemic struggle with high psychological pressure and therefore experience mental disorders and diseases, including particularly increased anxiety reactions, depressive symptoms and stress [22]. Frontline medical staff working in pulmonary, emergency, intensive care, and infectious diseases units were twice as likely to experience anxiety and depression as non-clinical staff with little potential for contact with COVID-19 patients. A meta-analysis among doctors and nurses working in the first line with infected patients indicated that the fear of a new unknown situation and infection is the main psychological challenge. Female gender and job-related stigma from family and society increased negative consequences such as stress and a feeling of social isolation [23]. Research conducted in the first year of the pandemic (N = 1001) on the health status of medical personnel working in intensive care units during the COVID-19 pandemic outbreak showed an increased frequency of symptoms of anxiety (46.5%), depression (30.2%) and burnout (51%) [24].

The possibility of appointing medical personnel to fight the pandemic in a different workplace and organizational changes in hospitals involving the transformation of hospitals or departments into COVID ones causes fear and disapproval among staff, especially among those inexperienced in working in intensive care positions. Lack of appropriate experience along with the lack of training for the indicated workplace causes uncertainty and fear among medical staff, not only due to the increased risk of COVID-19, but also for the safety of the patient. In their daily work, the personnel of the medical emergency system is confronted with situations requiring immediate life-saving measures, however, they are not prepared for long-term care of a patient in serious condition, both substantively and mentally.

Even the most resilient team members can become overwhelmed by situations that have personal significance, such as caring for someone who reminds them of a relative or friend. Even staff members experienced in reporting deaths and poor prognosis can be overwhelmed by having to do that many times over the long term. In these situations, both moral trauma and burnout can impact mental health [25], therefore, it is necessary to monitor the mental health of the personnel of the emergency medical care system at this particularly difficult time.

Research found that health care workers who experienced their COVID-19 deaths showed higher levels of depression and anxiety [20], which among employees burdened with the providing of health services for patients with a high risk of sudden patient death, such as an ambulance or the hospital emergency department, is of particular importance. A 2020 study of healthcare workers in Indonesia (N = 2132) [26] indicated that more than half of medical employees experienced anxiety and depression, and some of them even had suicidal thoughts. These studies indicate that this problem is particularly important and requires immediate attention.

### Post-traumatic stress disorder (PTSD) as a result of work on counteracting a pandemic

Barello et al. [27] indicates that health-care workers during a pandemic report the occurrence of psychological pressure associated with work, burnout and somatic symptoms. Emotional stress related to the impact of a pandemic on the working conditions of professionals is associated with the risk of such serious disorders as post-traumatic stress disorder (PTSD) [27]. The impact of fatigue and stress are assessed as the main causes of burnout syndrome and post-traumatic stress, which medical workers often struggle with [28].

Otorín Rodríquez and Lorca Sánchez [29] also points out that health care workers are at risk of psychological consequences such as burnout or even PTSD due to work-related stress during a prolonged pandemic. The latest conclusions of d'Ettorre et al. [30] clearly indicate that health care workers are struggling with post-traumatic stress disorder and the predictors of PTSD are factors such as young age, low work experience, work overload, female gender and lack of training and social support. Each of these factors should be considered in designing measures to prevent negative psychological responses in the frontline group during a pandemic.

# Emotional exhaustion and trauma among staff fighting COVID-19

Additionally, staff bear the burden of emotional contact with COVID-19 patients. Research in Egypt [31] has shown that around a third of paramedics have a high level of emotional exhaustion, which indicates working in extremely difficult emotional conditions in the time of a pandemic. Among employees of the healthcare system adapted to work in a pandemic situation, a vicarious trauma may also develop, experienced by people associated with caring for people who have been traumatized [32]. The results of Li et al.'s study [32] indicate that vicarious traumatization of medical personnel from outside the first line is more serious than in the case of staff from the first line. This finding suggests that non-frontline personnel are more likely to suffer from psychological problems, while the frontline personnel is mentally stronger [32] due to constant exposure to various pathogens and working conditions under stress.

In their standard work, the personnel of the medical emergency system comes into contact with people in a serious condition, however, these are short-term contacts, aimed at immediate actions related to saving the health and life of the patient. Working in COVID wards requires long-term care of the patient in a different way, often requiring more interpersonal interactions. Emotional support is important in the first line of patient care in order to protect the patient from the psychological effects of sudden severe stress. During the COVID-19 pandemic, it is important that paramedics can both reassure patients and themselves in the face of the virus. Dealing with emotions related to COVID-19 is especially important for paramedics as representatives of the emergency medical system, for whom mental well-being is essential to deal with extremely difficult circumstances, in which there is both a high risk of patient death and a high level of fear of serious illness and death as a result of COVID-19 among patients [7].

# The need to support employees of the emergency medical care system during the pandemic

Psychosocial risks at work include deterioration of physical and mental health as well as social consequences such as deterioration of interpersonal relations and an increase in conflict situations at the workplace [33] and also negative public reactions to healthcare professionals due to the possible transmission of the virus. A pandemic is a particularly intense and stressful time for medical personnel. Assessment of mental health and psychological support needs among health professionals (N = 933) working in Italy, where the first wave hit the unprepared health system the hardest, found that 71% of study participants showed signs of somatization [20], therefore it is important to support from colleagues, family and the general public and superiors.

Based on our own observations, it can be noticed that at the beginning of the pandemic, instrumental support turned out to be particularly desirable in the group of personnel working in direct contact with patients, such as the personnel of the emergency medical care. During the time of pandemics with high level of stress and workload, psychological and social support should be provided. In the onset of the pandemic, doctors, nurses, and paramedics faced an increased risk of stigma due to their direct exposure to COVID-19. The first respondents reported feelings of isolation, lack of support and understanding from family or friends, reducing of direct social interaction (e.g., family and friends) and increased feelings of sadness and anxiety [34]. With the growing knowledge on the COVID-19 epidemiology, there has been a decline in "hate" towards medical personnel working on the frontline of the fight against the SARS-CoV-2 virus. Social support is especially important for healthcare professionals due to its negative impact on anxiety, depression and emotional exhaustion resulting from the COVD-19 threat [35].

In the case of a new, so far unknown threat, it is also important to provide information support aimed at learning about epidemiology, diagnostics and methods of protection, and among the personnel of the emergency medical system, it is also important to learn about appropriate medical protection of the patient and themselves until transfer to the COVID department. It is important for the team leader to motivate the team and help them look beyond the current crisis for positives in the future, such as professional and personal development. It is a particularly stressful and intense time for both staff and management, so communication must go in both directions [8]. It should be ensured that the basic needs of medical personnel, such as the need for security, are met as much as possible. Sufficient disinfectants, personal protective equipment and medical staff can minimize stress levels, especially when exposed to a new unknown pathogen.

Psychological support of the medical staff is also very important. Research results suggest the need for psychological and social support and awareness-raising about COVID-19 [23], e.g., by disseminating reliable, up-to-date information, organizing training courses for medical personnel and providing resources in the field of personal protection while performing professional duties. The period of a pandemic for healthcare professionals is a time of uncertainty, so especially in the absence of healthcare professionals, returning to work should be particularly careful as even short absences have been shown to have an impact on workers, and in light of the numerous sudden changes in working conditions, workers, especially at the onset of the pandemic they weren't sure what they would come back to [36].

The results of Roberts et al.'s research [37] indicates that the most effective stress prevention among medical personnel are reduced workloads, practical support, consultations with employees regarding their needs and good communication between all staff members including management team. Due to the heavy workload and the fatigue resulting from the increased number of duties, the employer should provide sufficient breaks and provide a safe place to rest and have a meal. The duty schedule should include enough breaks between shifts to sleep and rest. Family support plays a protective role for stress [38]. However during pandemic, especially in the beginning or in case of COVID-19 infection medical personnel isolates from family members in order to protect them. During this difficult time support from co-workers is beneficial and is associated with secondary growth after the trauma [38].

Due to the epidemiological threat, organizing personal debriefing sessions after shifts is inadvisable, however, there are informal support groups on social media between medical workers. However, medical workers should also receive professional and psychological support. Early identification of symptoms among medical staff can improve the psychological well-being of service providers, reduce the risk of burnout and other mental problems [19]. Vanhaecht et al.'s research [39] indicates that 18–27% of medical staff reported the need for professional counseling from psychologists and more support from their management.

# Psychophysical condition of health care workers vs. the safety and quality of medical aid provided

Wu and Wei's research [40] indicates that the pandemic affects the functioning of frontline medical personnel. Assessment of the mental state of first-line medical personnel in epidemic conditions indicates the presence of anxiety, depression and stress disorders, and also affects the sleep state in this group [40]. Sleep deprivation can lead to emotional symptoms and consequently increase barriers to various systems such as immunity and memory [40]. Memory and concentration are especially important when saving a patient in a health and life-threatening condition, and any deterioration of these functions may have negative consequences for the patient.

Rarastanti et al. [41] also points out that stress at work has a negative impact on the performance of healthcare workers and a positive impact on burnout of healthcare workers. Research by Sahin et al. [42] also shows that the mental health of medical staff during a pandemic affects the quality of healthcare provided. Polish researchers show similar results. In the Wójcik et al.'s research [13] conducted in Polish hospital emergency departments, the employees of the medical emergency system mostly indicated that employee fatigue negatively affects the quality of medical services. It is particularly important in the group of people working in the medical rescue system, where not only the quality of the health services provided, but also the time of making decisions is crucial.

A cross-sectional study of 10 Ontario emergency medical services (N = 717) on the intensity of chronic stress associated with critical incidents showed a link between occupational stress and safety in the work environment. Paramedics' injuries showed a significant association with fatigue and critical stress. Considering that medication errors were also significantly associated with fatigue [43] it should be noted that the safety of patients depends on the psychophysical condition of medical personnel, in particular with the increase in stress factors and fatigue [43].

Excessively exploited staff as a result of staff shortages caused by the increased demand for medical staff in hospitals and COVID wards as well as numerous quarantines and isolation of co-workers and additional procedures, may pose a threat to both oneself, other employees and patients. Fatigue is associated with increased mistakes rate and have a negative impact on driving ability [44]. The safety of the rescue team, the patient and other road users depends on the speed of the driver's reaction, which can be reduced by prolonged stress. Based on author's own observations, in recent years an increasing number of accidents involving ambulances and rescue motorcycles can be noticed [43]. Lifshitz et al. [45] indicated that mistakes occurred in up to 12.76% of medication administrations in prehospital care. A high level of stress during the struggle for the patient's life may affect the number of errors in emergency departments, and side effects resulting from the wrong dosing of drugs or their wrong selection may be particularly dangerous [46].

Moreover, long-term stress can increase the blood pressure and increases the level of plasma cortisol what are the coronary heart disease risk factors. Chronic stress can also alter cholesterol levels and excessive activation of sympathetic nervous system [47]. Additionally, chronic stress is immunosuppressive for human bodies and can cause reduced natural killer cell cytotoxicity, decrease lymphocyte production and reduce humoral responses to immunization [47], what can increase vulnerability to COVID-19 infection [48] and increase absences at work of medical personnel. This is an important problem that should be taken into account in the human resources policy in the field of medical personnel, especially in the current epidemiological situation. More research is needed in order to identify the most effective and logistically available methods to combat stress among the group of emergency medical care personnel during the COVD-19 pandemic.

#### Limitations of the study

Only available online scientific resources have been reviewed. Articles published during the pandemic were reviewed, however, it should be noted that the long period between the execution of the research and the publication meant that not all the results were available to the authors at the time of paper preparation.

### CONCLUSIONS

A sudden, unforeseen epidemiological situation, a series of social and legal changes introduced in a short time may cause psychological disorders among the personnel of the medical rescue system. Healthcare organizations should pay particular attention to mental health support, safety and security in the workplace, and adequate compensation for firstline emergency medical system personnel [49]. Apart from instrumental and informative support, employers should provide organizational support. Providing enough breaks during work and allowing enough rest between shifts is important to reducing stress. It is necessary to pay more attention to the psychological problems of medical staff, especially women, young, inexperienced workers and people experiencing the death of the patient. These groups should be especially provided with psychological support, both in terms of psychological support for the entire team and individually. More research is needed in order to identify the most effective and logistically available methods to combat stress among emergency medical care personnel during the COVD-19 pandemic. The future research in the forms of stress prevention should be priority in the Public Health sector because emergency medical teams are the first and most important elements in the fight against COVID-19 and ensure the safety of society.

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