

UDC 619.9, 614.24-002, 159.96
DOI: 10.21668/health.risk/2021.4.18.eng



Research article

ON REVEALING RISK GROUPS REGARDING EMOTIONAL BURN-OUT SYNDROME AMONG MEDICAL WORKERS DURING THE COVID-19 PANDEMIC

**T.A. Platonova¹, A.A. Golubkova^{2,3}, S.S. Smirnova^{4,5}, E.V. Dyachenko⁵,
K.V. Shahova¹, A.D. Nikitskaya⁶**

¹European medical center “UMMC-Health”, 113 Sheinkmana Str., Ekaterinburg, 620144, Russian Federation

²Central research institute of epidemiology, 3A Novogireevskaya Str., Moscow, 111123, Russian Federation

³Russian Medical Academy for Continuous Professional Education, bldg. 1, 2/1 Barrikadnaya Str., Moscow, 125993, Russian Federation

⁴Ekaterinburg Research Institute of Viral Infections of the “Vector” State Research Center of Virology and Biotechnology, 23 Letnyaya Str., Ekaterinburg, 620030, Russian Federation

⁵Ural State Medical University, 3 Repina Str., Ekaterinburg, 620028, Russian Federation

⁶N.I. Pirogov’s Municipal Clinical Hospital No. 1, 8 Leninsky Ave., 117049, Moscow, Russian Federation

Medical workers have become a most affected population group during the pandemic of the new coronavirus infection (COVID-19). They were the first to start fighting against an unknown infection and at that stage their psychoemotional state determined not only correct evaluations of a situation but also relevant planning regarding control over it.

Our research aim was to study the peculiarities of reacting to stress of medical organizations in an emergency epidemic situation in order to reveal potential risk groups for developing emotional burnout syndrome.

We applied our own author’s anonymous online poll available at Google platform to examine psychoemotional state of medical workers. The poll had a built-in “Scale of perceived stress-10” that included two sub-scales; one of them measured a subjectively perceived level of the situation strain and the other, the amounts of efforts made by medical workers to overcome it. The poll was performed in November–December 2020; overall, 638 medical workers took part in it. They were of different age and sex and had different positions and working experience.

We established great variability in individual levels of overstrain as per the stress perception sub-scale ($Ex < 0$; $Ex = -0.59$) with more “low” than “high” values as per this sub-scale ($As > 0$; $As = 5.66$). Having analyzed variability of values as per the stress overcoming sub-scale, we revealed that they were homogenous ($Ex > 0$; $Ex = 3.98$) with prevailing “high” values ($As < 0$; $As = -6.97$).

Medical workers with their working experience being shorter than 5 years turned out to be a risk group with the most destructive reactions to long-term affecting stress factors at work and at home during the COVID-19 pandemic. Apart from them, high mental risks were also detected for workers who treated patients with COVID-19 as well as those who had previously had the coronavirus infection.

The research allowed obtaining actual data on psychoemotional state of medical workers during the COVID-19 pandemic and determining potential risk groups regarding developing emotional burnout syndrome. We substantiated the necessity to constantly provide psychological trainings for medical workers with their focus on peculiarities of their reacting during the first meeting with destabilizing factors and with further adjustment of educational programs provided for potential risk groups.

Key words: COVID-19, pandemic, medical workers, psychoemotional state, stress perception and overcoming, adjustment activities, psychological aid, emotional safety.

© Platonova T.A., Golubkova A.A., Smirnova S.S., Dyachenko E.V., Shahova K.V., Nikitskaya A.D., 2021

Tatyana A. Platonova – Candidate of Medical Sciences, Head of the Epidemiological Department (e-mail: fill.1990@inbox.ru; tel.: +7 (343) 344-27-67; ORCID: <https://orcid.org/0000-0001-5441-854X>).

Alla A. Golubkova – Doctor of Medical Sciences, Professor, Leading Researcher at the Laboratory for Healthcare Associated Infections (HAIs); Professor at the Department of Epidemiology (e-mail: allagolubkova@yandex.ru; tel.: +7 (912) 617-39-85; ORCID: <https://orcid.org/0000-0003-4812-2165>).

Svetlana S. Smirnova – Candidate of Medical Sciences, Head of the Ural-Siberian Scientific-Methodological Center for Preventing Healthcare Associated Infections (HAIs); Associate Professor at the Department of Epidemiology, Social hygiene and Organization of Sanitary-Epidemiological Service (e-mail: smirnova_ss69@mail.ru; tel.: +7 (343) 261-99-47; ORCID: <https://orcid.org/0000-0002-9749-4611>).

Elena V. Dyachenko – Candidate of Psychological Sciences, Associate Professor, Deputy Head of the Laboratory of Communication Skills at the Accreditation and Simulation center (e-mail: al-dyachenko@yandex.ru; tel.: +7 (922) 614-63-56; ORCID: <https://orcid.org/0000-0002-2221-5614>).

Kira V. Shahova – HR Director (e-mail: LytovaKV@ugmk-clinic.ru; tel.: +7 (343) 344-27-67; ORCID: <https://orcid.org/0000-0001-7929-8599>).

Anna D. Nikitskaya – epidemiologist (e-mail: NikiNiri@yandex.ru; tel.: +7 (906) 751-23-44; ORCID: <https://orcid.org/0000-0003-4836-8966>).

The pandemic of the new coronavirus infection (COVID-19) caused by SARS-CoV-2 virus, a previously unknown infections agent, has become an unprecedented challenge for the global community. According to official data, as of December 01, 2021 there were more than 250 million registered cases of COVID-19 contagion and more than 5 million deaths caused by the infection [1–4].

The COVID-19 pandemic has resulted in millions of people worldwide feeling fear and anxiety and has influenced their mental health. A lot of people have lost their relatives, faced long-term isolation and economic instability, and are now uncertain about their future. The existing situation has become a severe trial for the global community [5].

Medical workers have been at the front line in fighting this new dangerous infection from the very beginning. They were the first to suffer from it [6–10]. COVID-19 incidence among medical workers has been substantially higher than among other citizens and occupational groups at every stage in the pandemic development. Studies accomplished in May–June 2020 revealed that frequency of contagion reached 14 % among medical workers; 7 % of them had antigen of the infectious agent without any clinical signs of the disease and it was also considerably higher than in population studies [11–13]. Another research work established that COVID-19 prevalence was by 11 times higher among medical workers than among other population groups [14].

Since the beginning of the COVID-19 pandemic medical workers all over the world have been working under extreme physical and emotional loads. Psychoemotional state of medical workers was gravely destabilized by limited resources, long working shifts, sleeping disorders, imbalance between work and private life, as well as occupational risks associated with constant contacts with patients suffering from COVID-19. Several authors mentioned various risk factors that might cause mental disorders among medical workers; the most significant ones were an extreme situation, substantial changes in oc-

cupational activities and in overall lifestyle [15], specific clinical course of COVID-19 (fast development of the infection, grave complications, scarce knowledge about the new disease) [16], extreme loads at workplace, sleep becoming shorter and worse [17], a possibility to get infected when treating patients [18], a risk to infect family members or close friends [19], fears of not being properly provided with personal protective equipment (PPE) and expendables [20], physical discomfort related to the necessity to constantly wear PPE [21], isolation and uncertainty about the situation [16, 22].

These changes in occupational activities and everyday life of medical workers not only made them feel anxiety, fear, and anger but also induced acute stress reactions [23]. According to Tan B.Y.Q. and colleagues [24], this atmosphere created favorable conditions for such disorders as post-traumatic stress disorder (PTSD), anxiety and affective disorders that produced negative effects on mental health. Other authors mentioned that during the COVID-19 pandemic medical workers suffered from insomnia, anxiety, more or less apparent depression, and in some cases even certain addictions [25–30]. Most researchers believed that developing post-traumatic stress disorder unavoidably led to irreversible loss of human resources [28–31]. In another work, the authors expressed their deep concern about high frequency of emotional burnout among medical personnel since this could influence the quality of medical aid rendered to patients in case there were no timely remedial activities and mental aid provided for medical workers [32].

Several studies accomplished in different countries mostly focused on examining mental aspects regarding health of medical workers who treated patients in “red zones”. It was shown in one of them that medical workers who had direct contacts with COVID-19 patients suffered from greater anxiety and had symptoms of depression or PTSD more frequently than their colleagues who didn’t work in a “red zone” [33]. Besides, medical workers

who treated patients with COVID-19 in a “red zone” not only had to perform their occupational tasks but also had to be able to evaluate negative emotional reactions by patients and react adequately to them; we should bear in mind that they had to do it without any special training in communication, psychology, or psychiatry [34, 35]. Another study concentrated on analyzing peculiarities of stress perception by different occupational groups of workers in a “red zone”; it was shown that middle medical personnel (nurses) who had longer contacts with patients and had to communicate with them more closely than doctors were exposed to higher risks of developing emotional burnout [36]. Also, according to data obtained in the poll by Lee S.M. with colleagues [37], the necessity to use a full set of personal protective equipment became a serious communication barrier for medical workers that made it more difficult for them to communicate with colleagues; this, together with challenges arising in communicating with patients, created even more stressful working conditions.

We should also mention that there have been almost no complex studies focusing on assessing psychoemotional state of medical workers from various occupational groups or non-medical personnel employed by medical organizations although such employees play a no lesser role in implementing various business processes in a medical organization thus helping to render qualitative medical aid to patients.

Given all that, it is becoming truly vital to evaluate psychoemotional state of medical and non-medical personnel at a medical organization during the pandemic of the new coronavirus infection; it is also important to examine prevailing types of emotional reactions during a crisis since it allows developing relevant preventive and rehabilitation programs for personnel employed by a medical organization.

Our research aim was to study the peculiarities of reacting to stress of medical organization in an emergency epidemic situation in order to reveal potential risk groups for developing emotional burnout syndrome.

Materials and methods. The present research involved examining psychoemotional state of personnel employed by medical organizations during the second epidemic rise in COVID-19 incidence bearing in mind peculiarities of stress perception and reacting to stress factors during this crisis. Evaluation of psychoemotional state as well as profound examination of factors that cause stress in medical workers during the pandemic allow obtaining data necessary for developing efficient ways to provide such workers with relevant organizational and psychological aid [16, 32, 38, 39].

We applied *The Perceived Stress Scale-10*, “PSS-10”¹ as our measuring tool; it gave an opportunity to evaluate how much stress, in workers’ opinion, occurred in their life during the month previous to the present research. The scale was made from two sub-scales; one of them determined a subjectively perceived level of the situation strain, and the other, the amount of efforts medical and non-medical workers had to make to overcome it.

The perceived stress scale was built into an anonymous online poll created by us and based on a Google platform; the poll was suggested to medical and non-medical workers by corporate mail, such messengers as WhatsApp or Telegram, or it was available on specialized online resources adapted for use by public healthcare workers. The poll was available in November–December 2020; overall, 638 workers employed by medical organizations took part in it. They were of different age and sex, occupied different positions and had different working experience. Their functional responsibilities regarding medical aid rendered to patients with COVID-19 and their infectious health history regarding the disease were also different (Table).

¹ Shkala vosprinimaemogo stressa-10 [The perceived stress scale-10]. Available at: <https://therapy.irkutsk.ru/doc/pss.pdf> (March 05, 2021) (in Russian).

Table
Profile of workers employed by medical organizations who took part in the poll

№	Parameter	Absolute	%
Position			
1	Doctor	276	43.3
2	Middle medical personnel (nurses)	150	23.5
3	Administrative worker	51	8.0
4	Non-medical personnel	161	25.2
Sex			
5	Male	102	16.0
6	Female	536	84.0
Working experience, years			
7	Less than 5	192	30.1
8	6–10	109	17.1
9	11–20	145	22.7
10	Longer than 20	192	30.1
Occupational activities are related to treating patients with COVID-19			
11	Yes	263	41.2
12	No	375	58.8
Had COVID-19 prior to answering the poll			
13	Yes	200	31.3
14	No	438	68.7

We applied asymmetry (A_s) and excess (Ex) rates as measures of variability to describe distribution of respondents as per analyzed parameters. The results on the sub-scale 1 were interpreted as follows: 0–10 scores meant neutral “green” zone that corresponded to well-balanced psychoemotional state; 11–18 scores meant border “yellow” zone, that is, classic stress perception or a strain zone; 19–30 scores were “red zone”, that is, overstrain. Another approach was used to interpret results on the sub-scale 2 (strategy of reacting to stress and overcoming it), namely: 0–12 scores were a “red zone” that corresponded to high sensitivity to stress and no available resources to overcome it in a constructive way; 13–17 scores were a “yellow zone” where workers had limited resources necessary to overcome emotional overstrain; 18–20 scores were a “green one” where workers had the greatest adaptation potential as regards overcoming stress loads.

We built up a multi-cell contingency table to comparatively assess research results obtained for different occupational groups of

workers employed by medical organizations. Statistical significance of differences was estimated with Pearson’s chi-square and results of post hoc analysis. Differences were considered authentic at $p < 0.05$. Data were statistically analyzed with Google electronic services, Microsoft Office 2013 and IBM SPSS Statistics (Version 26).

Results and discussion. We assessed how medical workers perceived the situation strain using measures of variability; our assessment established certain peculiarities indicating that individual levels of emotional overstrain varied greatly ($Ex < 0$, $Ex = -0.66$) and that “low” values as per this sub-scale prevailed over “high” ones ($A_s > 0$, $A_s = 5.42$). This fact indicates that most workers employed by medical organizations were able to perceive stress factors adequately; however, great variability of this indicator means that there were certain differences in stress perception between some occupational groups (Figures 1–5).

Non-constructive scenarios in stress perception (“red zone”, 19–30 scores) were detected in 61 (22.1 %) doctors, 18 (12.0 %) nurses, 9 (17.6 %) administrative workers and 33 (20.5 %) non-medical personnel ($\chi^2 = 6.805$, $p = 0.078$). Having analyzed respondents’ gender characteristics, we didn’t reveal any significant differences in stress perception; 15 males (14.7 %) and 106 females (19.8 %) were in a “red zone” according to this sub-scale (19.8 %) ($\chi^2 = 1.433$, $p = 0.231$).

When it comes to working experience, we established that workers with their working experience being shorter than 5 years had the highest overstrain and perceived stress worse than their colleagues with longer working experience. Non-constructive stress perception (emotional overstrain) was detected in 56 (29.2 %) respondents with working experience being shorter than 5 years; in 23 (21.1 %) respondents with working experience being 6–10 years; 17 (11.7 %) respondents with working experience being 11–20 years; 25 (13.0 %) respondents with working experience exceeding 20 years ($\chi^2 = 22.686$, $p < 0.001$). This fact found further confirmation in post hoc

analysis when we compared stress perception by people with working experience being shorter than 5 years, 11–20 years, and longer than 20 years ($p < 0.001$).

Specific procedures involved in rendering aid to patients with the new coronavirus infection turned out to become a significant destabilizing factor for workers employed by medical organizations. Thus, non-constructive stress perception was detected in 62 (23.6 %) workers who treated patients with COVID-19 while they occurred only in 59 (15.7 %) workers who didn't deal with treating such patients ($\chi^2 = 6.184, p = 0.013$).

We also established that workers who had previously had COVID-19 tended to perceive stress factors less constructively. Thus, 84 (22.5 %) workers who had had COVID-19 couldn't perceive stress adequately and it was higher than among those without the disease in their health history, 37 (14.0 %) ($\chi^2 = 7.383, p = 0.007$).

Analysis of results as per the sub-scale showing resistance to stress involved examining measures of variability in reacting to stress. The analysis revealed that obtained values were rather homogenous ($Ex > 0, Ex = 3.98$) with “high” values prevailing over “low” ones ($As < 0, As = -6.97$). This indicated that most workers employed by medical organizations tended to have similar scenarios for overcoming stress and were able to react to it constructively in most cases. However, there were people in a “red zone” (lower than 12 scores) due to absence of any capability to overcome stress and too much effort made to resist destabilizing factors (Figures 1–5).

65 (23.6 %) doctors, 32 (21.3 %) nurses, 8 (15.7 %) administrative workers, and 37 (23.0 %) non-medical personnel overcame stress with a lot of overstrain ($\chi^2 = 1.662, p = 0.645$). We didn't reveal any gender-related significant differences in efforts made to overcome stress; 18 (17.6 %) males and 124 (23.1 %) females were in a “red zone” according to this sub-scale ($\chi^2 = 1,491, p = 0,222$).

We also established that workers with their working experience being less than 5 years had the greatest difficulty in overcoming stress situations. 56 (29.2 %) respondents from this group mentioned psychoemotional overstrain involved in resisting stress; there were 25 (24.3 %) such workers among those with their working experience being 6–10 years; 29 (20.0 %), 11–20 years; 32 (16.7 %), longer than 20 years ($\chi^2 = 9.221, p = 0.026$). Post hoc analysis revealed significant differences between people with their working experience being shorter than 5 years and those with their working experience exceeding 20 years ($p = 0.021$).

We didn't reveal any significant differences in reacting to stress among workers who treated patients with COVID-19 and their colleagues who didn't deal with it. Workers from both these groups had similar ways to overcome stress. Non-constructive ways to overcome stress were detected in 63 (21.0 %) workers in the group who treated people with COVID-19; there were 79 (21.1 %) such workers among those who didn't have any contacts with COVID-19 patients ($\chi^2 = 0.745, p = 0.388$).

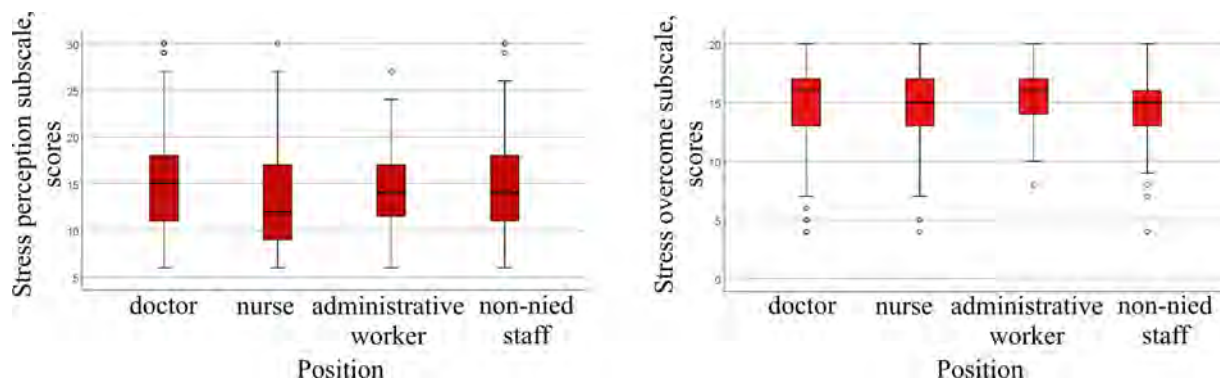


Figure 1. Poll results obtained for different occupational groups as per two sub-scales in PSS-10

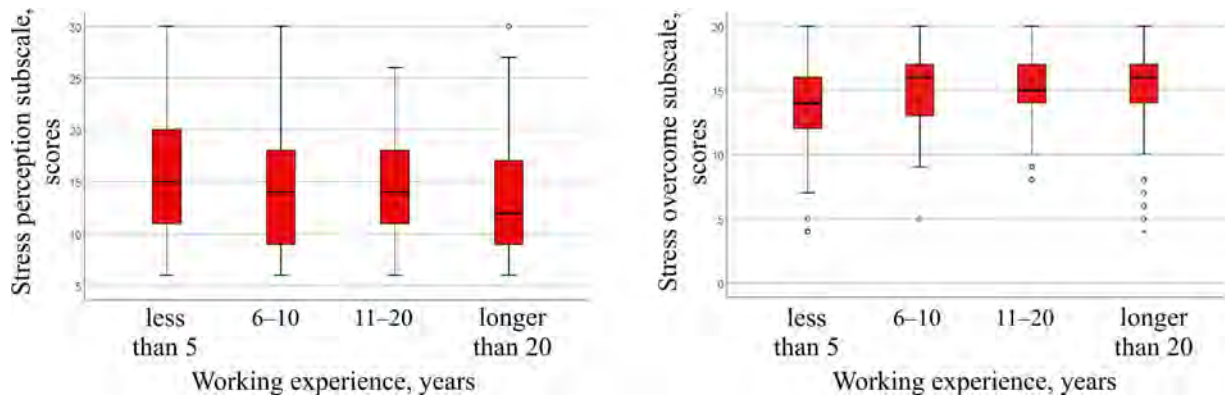


Figure 2. Poll results obtained for workers with different working experience as per two sub-scales in PSS-10

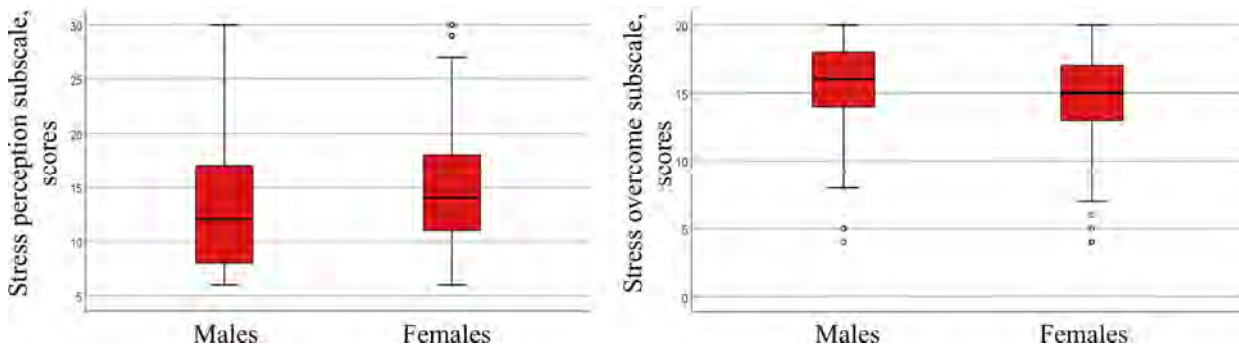


Figure 3. Poll results obtained for workers of different sex as per two sub-scales in PSS-10

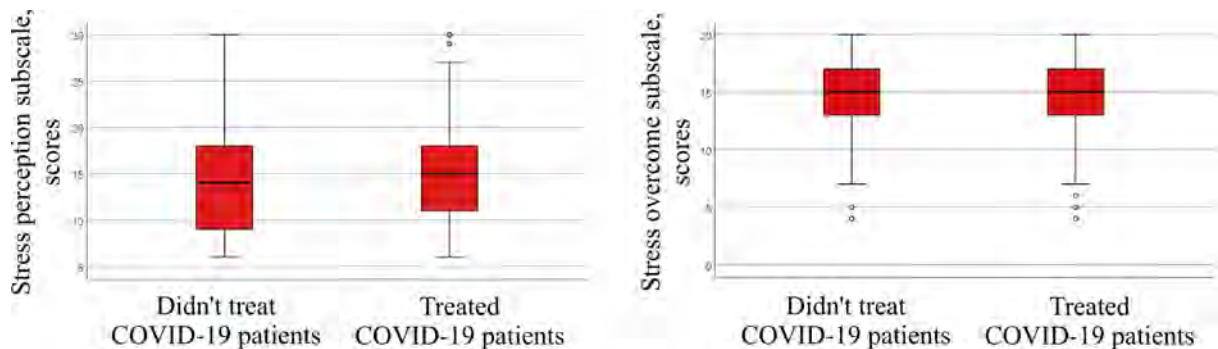


Figure 4. Poll results obtained for workers with different functional responsibilities per two sub-scales in PSS-10

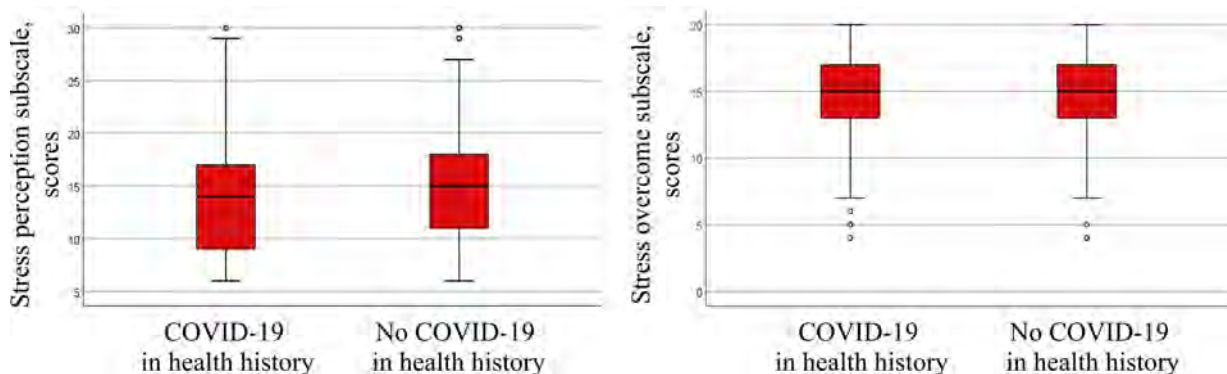


Figure 5. Poll results obtained for workers with different health history regarding COVID-19 per two sub-scales in PSS-10

COVID-19 in health history also didn't have any significant influence on how workers employed by medical organizations overcame stress. 88 (23.6 %) people among those who had had the disease spent too much effort on overcoming stress and there were 50 (20.4 %) such people among those who hadn't had the infections before ($\chi^2 = 0.926$, $p = 0.336$).

Therefore, assessment of subjective stress perception and reacting to it among workers employed by medical organizations allowed us to determine a risk group as per inadequate strategies for perceiving and overcoming stress factors and, consequently, prone to more rapidly developing emotional burnout. This group included workers with their working experience being shorter than 5 years. It was them who needed expert psychological aid the most in difficult situations that involved grave physical and psychoemotional conditions at workplaces including the period during the new coronavirus infection pandemic. And medical workers who treat patients with COVID-19 as well as those who have already had the disease are also exposed to greater risks since they tend to pursue more apparent non-constructive ways to perceive stress though preserving certain resources to overcome it.

There were several leading factors that could destabilize psychoemotional state of workers employed by medical organizations, their stress perception and reacting to it. Thus, participants mentioned personal issues that were not related to work in 24.8 % cases; uncertainty, impossibility to have any plans for the future and to be sure they could be realized, 24.4 % cases; apparent time deficiency, 22.9 % cases; a fear to get infected with the coronavirus infection and a fear that relatives or close friends could get infected with it, 14.6 % cases; hard physical and psychological working conditions during the pandemic, 13.3 % cases.

In the existing situation it is advisory to provide workers employed by medical or-

ganizations with relevant remedial activities including psychological aid and developing their skills in psychological self-regulation in emergency situations. There have been several studies accomplished in the sphere. For example, there was a research work that described experience in organizing a psychological training for nurses and paramedics to get them ready to work with COVID-19 patients. The training was aimed at developing workers' communicative competence, creating skills of emotional self-regulation under stress, preventing emotional burnout and raising resistance to stress in extreme working conditions. 120 medical workers took part in the training. The program efficiency was assessed as per feedback provided by the participants. They were able to name and detect their "fears", determine their private motives and values, compare them with motives and values of other group participants, plan how to find a solution in a difficult work situation, get an insight into reasons for anxious reacting to various factors, and make use of certain recommendations on decreasing emotional strain and returning to a calm productive state of mind. The training participants stated that in future they wished to be provided with psychological aid in any form, both group and individual. The authors noted that it was obligatory to include a component related to psychological training into educational programs in higher and secondary medical educational establishments, skills development courses and training programs provided for personnel directly at their workplaces in medical organizations. This psychological training has become truly vital in the existing situation when rendering medical aid to population involves a lot of stress, multi-tasking, and uncertainty [40].

However, we should note that medical workers are not always ready to accept expert psychological aid and support. As it was noted in the study [39], medical workers were often too self-confident, thought themselves

to be quite self-sufficient and preferred not to appeal for any psychological aid. All this may have negative consequences under constantly growing workloads and the necessity to solve tasks that are beyond their clinical knowledge and competences when medical workers have to fight new, previously unknown diseases they have never met before. The authors of another research work [41] highlight that when medical workers fail to communicate properly with their colleagues, it can lead to absenteeism and/or mistakes made when dealing with common occupational tasks as it has already been described in organizational psychology and psychology of health as consequences of occupational stress and occurring job burnout [42].

There was another work [43] where it was shown that apparent emotional burnout associated with developing additions might create certain obstacles for medical workers in appealing for psychological aid. These obstacles could include the following: medical workers denying they had the problem, that is, an addiction and loss of working capacity; a fear of probable stigmatization; concomitant mental disorders, a fear to acknowledge an addiction and the necessity to get treatment (regarding family relations, work, and financial well-being); lack of knowledge on the subject.

Chen Q. with colleagues [38] described in their study that medical personnel were rather unwilling to take part in any individual or group psychological trainings at the first stage in the pandemic. Some medical workers who were noticed by psychologists were so agitated and irritated that it influenced their behavioral patterns. But still they refused to get any rest and demonstrated even greater involvement into work. Those workers denied having any psychological problems and refused from any psychological support. When asked to give basic reasons for refusing from such aid, medical workers stated that they didn't have any psychological issues apart from concerns that

not enough PPE would be available to them, a fear to become a source of the infection for relatives and close friends; they also mentioned they needed rest due to substantial physical loads but they didn't need any psychological aid.

The present research which was performed during the "second wave" of the pandemic revealed that 434 respondents (68.0 % of those who took part in the poll) were ready to appeal for expert psychological aid. This might indirectly imply that their psychoemotional state was already strained. Obviously, workers employed by medical organizations who took part in our research were well aware that they were unable to react to stress factors constructively on their own, understood that the situation was grave, wide-scale, and likely to linger for a long time and it was necessary to accept new living conditions in this "new reality". Our respondents already felt they needed psychological aid and were ready to accept it willingly.

Given that, it seems well-grounded that if we want to prevent developing complicated psychoemotional disorders, depressions and anxieties, and emotional burnout among workers employed by medical organizations, we should provide them with psychological aid already after the first meeting with a destabilizing factor. Bearing in mind that there are risks of similar epidemic situations in the future, it is necessary to implement a new component into medical organizations functioning, namely psychological aid and support aimed at preserving workers' health and working capacities. This can be done by creating specialized departments or services within medical organizations.

This suggestion correlates with statements given in several published works [44–46] where it was shown that a set of activities including efficient communications, access to adequate protection equipment, regular rest and rational work and leisure regimes, as well as organizational and psychological support could not only improve

workers' psychoemotional state but also prevent mental diseases among them in short- and long-term prospects.

Conclusion. Therefore, the research results allowed us to establish that workers with their working experience being less than 5 years were a risk group with the highest overstrain when reacting to long-term stress factors both in everyday life and at a workplace during the COVID-19 pandemic. It is this group that requires psychological aid the most; this aid should include cognitive and behavioral therapy, training with its focus on how to use specific reacting algorithms (coping strategies) in order to develop constructive behavioral patterns aimed at overcoming destabilizing stress

situations. Besides, workers who treat patients with COVID-19 and workers who have had the disease themselves are also exposed to high psychological risks. Such workers often tend to perceive stress in a non-constructive way, although, as it has been detected in our research, they still have sufficient resources for operative resistance to stress. This requires developing programs aimed at psychological prevention and rehabilitations for people with Long-COVID.

Funding. The research was not granted any financial support.

Conflict of interests. The authors declare there is no any conflict of interests.

References

1. Briko N.I., Kagramanyan I.N., Nikiforov V.V., Suranova T.G., Chernyavskaya O.P., Polezhaeva N.A. Pandemic COVID-19. Prevention Measures in the Russian Federation. *Epidemiologiya i vaksinosprofilaktika*, 2020, vol. 19, no. 2, pp. 4–12. DOI: 10.31631/2073-3046-2020-19-2-4-12 (in Russian).
2. Shchelkanov M.Yu., Kolobukhina L.V., Burgasova O.A., Kruzhkova I.S., Maleev V.V. COVID-19: etiology, clinical picture, treatment. *Infektsiya i immunitet*, 2020, vol. 10, no. 3, pp. 421–445. DOI: 10.15789/2220-7619-CEC-1473 (in Russian).
3. Coronavirus (COVID-19): online map showing the coronavirus infection spread. Available at: <https://coronavirus-monitor.ru/> (01.03.2021) (in Russian).
4. Coronavirus: online map of coronavirus infection, statistics. Available at: <https://coronavirus-monitor.info/> (01.03.2021) (in Russian).
5. Shakirova A.T., Koibagarova A.A., Osmonaliev M.K., Ahmedov M.T., Ibraimova A.J. Impact of COVID-19 on the psychological state of people. *Evrasiiskii soyuz uchenyh*, 2020, vol. 79, no. 10, pp. 50–53 (in Russian).
6. Alserehi H.A., Alqunaibet A.M., Al-Tawfiq J.A., Alharbi N.K., Alshukairi A.N., Alanazi K.H., Bin Saleh G.M., Alshehri A.M. [et al.]. Seroprevalence of SARS-CoV-2 (COVID-19) among healthcare workers in Saudi Arabia: comparing case and control hospitals. *Diagnostic Microbiology and Infectious Disease*, 2021, vol. 99, no. 3, pp. 115273. DOI: 10.1016/j.diagmicrobio.2020.115273
7. Chou R., Dana T., Buckley D.I., Selph S., Fu R., Totten A.M. Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers: A Living Rapid Review. *Ann. Intern. Med.*, 2020, vol. 173, no. 2, pp. 120–136. DOI: 10.7326/M20-1632
8. Kursumovic E., Lennane S., Cook T. Deaths in healthcare workers due to COVID-19: the need for robust data and analysis. *Anaesthesia*, 2020, vol. 75, no. 8, pp. 989–992. DOI: 10.1111/anae.15116
9. Wang X., Liu W., Zhao J., Lu Y., Wang X., Yu C., Hu S., Shen N. [et al.]. Clinical characteristics of 80 hospitalized frontline medical workers infected with COVID-19 in Wuhan, China. *J. Hosp. Infect.*, 2020, vol. 105, no. 3, pp. 399–403. DOI: 10.1016/j.jhin.2020.04.019
10. Calo F., Russo A., Camaioni C., De Pascalis S., Coppola N. Burden, risk assessment, surveillance and management of SARS-CoV-2 infection in health workers: a scoping review. *Infect. Dis. Poverty*, 2020, vol. 9, no. 1, pp. 139. DOI: 10.1186/s40249-020-00756-6
11. Treibel T.A., Manisty C., Burton M., McKnight A., Lambourne J., Augusto J.B., Couto-Parada X., Cutino-Moguel T. [et al.]. COVID-19: PCR screening of asymptomatic health-care workers at London hospital. *Lancet*, 2020, vol. 395, no. 10237, pp. 1608–1610. DOI: 10.1016/S0140-6736(20)31100-4
12. Hunter E., Price D.A., Murphy E., van der Loeff I.S., Baker K.F., Lendrem D., Lendrem C., Schmid M.L. [et al.]. First experience of COVID-19 screening of health care workers in England. *Lancet*, 2020, vol. 395, no. 10234, pp. e77–e78. DOI: 10.1016/S0140-6736(20)30970-3
13. Tan Z., Khoo D.W.S., Zeng L.A., Tien J.-C.C., Lee A.K.Y., Ong Y.Y., Teo M.M., Abdullah H.R. Protecting health care workers in the front line: Innovation in COVID-19 pandemic. *J. Glob. Health*, 2020, vol. 10, no. 1, pp. 010357. DOI: 10.7189/jogh.10.010357
14. Nguyen L.H., Drew D.A., Graham M.S., Joshi A.D., Guo C.-G., Ma W., Mehta R.S., Warner E.T. [et al.]. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *Lancet Public Health*, 2020, vol. 5, no. 9, pp. 475–483. DOI: 10.1016/S2468-2667(20)30164-X
15. Tsaranov K.N., Zhiltsov V.A., Klimova E.M., Tarbastaev A.G. Perceptions of personal safety hazards in the context of the COVID-19 pandemic by USA and Russian medical staff. *Vestnik Moskovskogo gosudarstvennogo oblastnogo universiteta*, 2020, no. 2, pp. 236–247 (in Russian).
16. El-Hage W., Hingray C., Lemogne C., Yrondi A., Brunault P., Bienvenu T., Etain B., Paquet C. [et al.]. Health professionals facing the coronavirus disease 2019 (COVID-19) pandemic: What are the mental health risks? *Encephale*, 2020, vol. 46, no. 3S, pp. S73–S80. DOI: 10.1016/j.encep.2020.04.008 (in French).
17. Kononov A.N. Anxiety about the future in the context of a coronavirus pandemic: a content analysis study. *Vestnik Moskovskogo gosudarstvennogo oblastnogo universiteta. Seriya: Psikhologicheskie nauki*, 2020, no. 3, pp. 18–28. DOI: 10.18384/2310-7235-2020-3-18-28 (in Russian).
18. Petrikov S.S., Kholmogorova A.B., Suroegina A.Yu., Mikita O.Yu., Roy A.P., Rakhmanina A.A. Professional burnout, symptoms of emotional disorders and distress among healthcare professionals during the COVID-19 epidemic. *Konsul'tativnaya psikhologiya i psikhoterapiya*, 2020, vol. 28, no. 2 (108), pp. 8–45. DOI: 10.17759/cpp.2020280202 (in Russian).
19. Piskunova V.V. Psychological preparedness of future nurses to provide medical services in a pandemic. *Vestnik Prikamskogo social'nogo instituta*, 2020, vol. 86, no. 2, pp. 57–59 (in Russian).

20. Rasskazova E.I., Leontiev D.A., Lebedeva A.A. Pandemic as a challenge to subjective well-being: anxiety and coping. *Konsul'tativnaya psikhologiya i psikhoterapiya*, 2020, vol. 28, no. 2 (108), pp. 90–108 (in Russian).
21. Staniszewska Z., Staniszewski M. Perspectives and significance of psychoprevention and psychotherapy of the consequences of global stressful situations in connection with the COVID-19 pandemic. *Studia Humanitatis*, 2020, no. 3, pp. 8 (in Russian).
22. Kholmogorova A.B., Petrikov S.S., Suroyegina A.Yu., Mikita O.Yu., Rakhmanina A.A., Roy A.P. Burnout and its factors in healthcare workers involved in providing health care for patients with COVID-19 at different stages of the pandemic. *Neotlozhnaya meditsinskaya pomoshch'. Zhurnal im. N.V. Sklifosovskogo*, 2020, vol. 9, no. 3, pp. 321–337. DOI: 10.23934/2223-9022-2020-9-3-321-337 (in Russian).
23. Xiang Y.-T., Yang Y., Li W., Zhang L., Zhang Q., Cheung T., Ng C.H. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry*, 2020, vol. 7, no. 3, pp. 228–229. DOI: 10.1016/s2215-0366(20)30046-8
24. Tan B.Y.Q., Chew N.W.S., Lee G.K.H., Jing M., Goh Y., Yeo L.L.L., Zhang K., Chin H.-K. [et al.]. Psychological Impact of the COVID-19 Pandemic on Health Care. *Ann. Intern. Med.*, 2020, vol. 173, no. 4, pp. 317–320. DOI: 10.7326/M20-1083
25. Lasalvia A., Bonetto C., Porru S., Carta A., Tardivo S., Bovo C., Ruggeri M., Amaddeo F. Psychological impact of COVID-19 pandemic on healthcare workers in a highly burdened area of north-east Italy. *Epidemiol. Psychiatr. Sci.*, 2020, vol. 30, pp. e1. DOI: 10.1017/S2045796020001158
26. Bohlken J., Schömig F., Lemke M.R., Pumberger M., Riedel-Heller S.G. COVID-19-Pandemie: Belastungen des medizinischen Personals [COVID-19 Pandemic: Stress Experience of Healthcare Workers – A Short Current Review]. *Psychiatr. Prax.*, 2020, vol. 47, no. 4, pp. 190–197. DOI: 10.1055/a-1159-5551 (in German).
27. Sahebi A., Nejati B., Moayedi S., Yousefi K., Torres M., Golitaleb M. The prevalence of anxiety and depression among healthcare workers during the COVID-19 pandemic: An umbrella review of meta-analyses. *Prog. Neuropsychopharmacol. Biol. Psychiatry*, 2021, vol. 107, pp. 110247. DOI: 10.1016/j.pnpbp.2021.110247
28. Barello S., Palamenghi L., Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res.*, 2020, vol. 290, pp. 113129. DOI: 10.1016/j.psychres.2020.113129
29. Suryavanshi N., Kadam A., Dhupal G., Nimkar S., Mave V., Gupta A., Cox S.R., Gupte N. Mental health and quality of life among healthcare professionals during the COVID-19 pandemic in India. *Brain Behav.*, 2020, vol. 10, no. 11, pp. e01837. DOI: 10.1002/brb3.1837
30. Lasalvia A., Amaddeo F., Porru S., Carta A., Tardivo S., Bovo C., Ruggeri M., Bonetto C. Levels of burn-out among healthcare workers during the COVID-19 pandemic and their associated factors: a cross-sectional study in a tertiary hospital of a highly burdened area of north-east Italy. *BMJ Open*, 2021, vol. 11, no. 1, pp. e045127. DOI: 10.1136/bmjopen-2020-045127
31. Chew N.W.S., Lee G.K.H., Tan B.Y.Q., Jing M., Goh Y., Ngiam N.J.H., Yeo L.L.L., Ahmad A. [et al.]. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav. Immun.*, 2020, vol. 88, pp. 559–565. DOI: 10.1016/j.bbi.2020.04.049
32. Pervichko E., Koniukhovskaia J. Psychological well-being of doctors and healthcare providers during the COVID-19 pandemic: overview of foreign studies. *Psikhiatriya, psikhoterapiya i klinicheskaya psikhologiya*, 2020, vol. 11, no. 3, pp. 595–608. DOI: 10.34883/PI.2020.11.3.016 (in Russian).
33. Lu W., Wang H., Lin Y., Li L. Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. *Psychiatry Res.*, 2020, vol. 288, pp. 112936. DOI: 10.1016/j.psychres.2020.112936
34. Duan L., Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry*, 2020, vol. 7, no. 4, pp. 300–302. DOI: 10.1016/S2215-0366(20)30073-0
35. Lima C.K.T., de Medeiros Carvalho P.M., de Araújo Araruna Silva Lima I., de Oliveira Nunes J.V.A., Saraiva J.S., de Souza R.L., da Silva C.G.L., Neto M.L.R. The emotional impact of Coronavirus 2019-nCoV (new Coronavirus disease). *Psychiatry Res.*, 2020, vol. 287, pp. 112915. DOI: 10.1016/j.psychres.2020.112915
36. Shen X., Zou X., Zhong X., Yan J., Li L. Psychological stress of ICU nurses in the time of COVID-19. *Crit. Care*, 2020, vol. 24, no. 1, pp. 200. DOI: 10.1186/s13054-020-02926-2
37. Lee S.M., Kang W.S., Cho A.-R., Kim T., Park J.K. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr. Psychiatry*, 2018, vol. 87, pp. 123–127. DOI: 10.1016/j.comppsy.2018.10.003
38. Chen Q., Liang M., Li Y., Guo J., Fei D., Wang L., He L., Sheng C. [et al.]. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry*, 2020, vol. 7, no. 4, pp. e15–e16. DOI: 10.1016/s2215-0366(20)30078-x
39. Shanafelt T., Ripp J., Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. *JAMA*, 2020, vol. 323, no. 21, pp. 2133–2134. DOI: 10.1001/jama.2020.5893
40. Abrosimov I.N., Vorotylo N.V., Kuznetsova Yu.S., Volchkova Yu.V., Pankova D.P., Sadjaya S.T., Kanatbek quzu A., Samilina U.V. Experience in organizing psychological training of medical personnel to work with patients with COVID-19. *Meditsinskaya psikhologiya v Rossii*, 2021, vol. 13, no. 2 (67), pp. 1–6. DOI: 10.24412/2219-8245-2021-2-2 (in Russian).
41. Ornell F., Halpern S.C., Kessler F.H.P., de Magalhães Narvaez J.C. The impact of the COVID-19 pandemic on the mental health of healthcare professional. *Cad. Saude Publica*, 2020, vol. 36, no. 4, pp. e00063520. DOI: 10.1590/0102-311X00063520
42. Maslach C., Schaufeli W.B., Leiter M.P. Job burnout. *Annu. Rev. Psychol.*, 2001, vol. 52, pp. 397–422. DOI: 10.1146/annurev.psych.52.1.397
43. Vayr F., Herin F., Jullian B., Soulat J.M., Franchitto N. Barriers to seeking help for physicians with substance use disorder: A review. *Drug Alcohol Depend.*, 2019, vol. 199, pp. 116–121. DOI: 10.1016/j.drugalcdep.2019.04.004
44. Blake H., Birmingham F., Johnson G., Tabner A. Mitigating the Psychological Impact of COVID-19 on Healthcare Workers: A Digital Learning Package. *Int. J. Environ. Res. Public Health*, 2020, vol. 17, no. 9, pp. 2997. DOI: 10.3390/ijerph17092997
45. Ho C.S., Chee C.Y., Ho R.C. Mental Health Strategies to Combat the Psychological Impact of Coronavirus Disease 2019 (COVID-19) Beyond Paranoia and Panic. *Ann. Acad. Med. Singap.*, 2020, vol. 49, no. 3, pp. 155–160.
46. Li W., Yuan Y., Liu Z.-H., Zhao Y.-J., Zhang Q., Zhang L., Cheung T., Xiang Y.-T. Progression of Mental Health Services during the COVID-19 Outbreak in China. *Int. J. Biol. Sci.*, 2020, vol. 16, no. 10, pp. 1732–1738. DOI: 10.7150/ijbs.45120

Platonova T.A., Golubkova A.A., Smirnova S.S., Dyachenko E.V., Shahova K.V., Nikitskaya A.D. On revealing risk groups regarding emotional burn-out syndrome among medical workers during the COVID-19 pandemic. *Health Risk Analysis*, 2021, no. 4, pp. 161–170. DOI: 10.21668/health.risk/2021.4.18.eng

Received: 11.03.2021

Accepted: 07.12.2021

Published: 30.12.2021