

*Original article*

## **Psychoeducational Training for Reducing the Impact of COVID-19 Pandemic on Healthcare Workers**

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### **SUMMARY**

**Introduction.** Healthcare workers are increasingly exposed to long-term traumatic events in the context of the COVID-19 pandemic.

**Methods.** We conducted a study that included 100 healthcare workers and 50 healthy individuals. We used the Perceived Stress Scale, Hospital Anxiety and Depression Scale, and Global Patient Impression for Improvement in the assessment of the psychological condition of respondents. To improve the psycho-emotional state of health care workers, we proposed a program of psychoeducational training that was conducted at the workplace. After it, we reassessed the level of perceived stress, anxiety, and depression.

**Results.** During the COVID-19 pandemic, in healthcare workers, the level of stress and anxiety was higher than in non-medical specialties, and the level of depression was not significantly different. The reduction of stress and anxiety was found. The subjective assessment of the improvement of the general condition indicates its positive dynamics after the psychoeducational training in both doctors and nurses.

**Conclusion.** We showed the effectiveness of the proposed psychoeducational methodology for improving the psycho-emotional condition of healthcare workers during the COVID-19 pandemic.

**Keywords:** health personnel, COVID-19, anxiety, depression, psychological stress

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## INTRODUCTION

The twenty-first century brought to people three fatal epidemics associated with coronaviruses. The basis of diseases caused by these viruses is acute respiratory infections with high contagiousness and lethality. The study of the multi-year history of coronaviruses does not provide final responses to the question of the emergence of the coronavirus disease 2019 (COVID-19) in the human population (1, 2). COVID-19 is caused by the coronavirus of severe acute respiratory syndrome-2 (SARS-COV-2), which was first discovered in Wuhan, China. Until March 5, 2022, more than 440 million instances of COVID-19 and more than 6 million deaths were documented globally, according to the most recent statistics (3).

This virus affects not only the respiratory system, as it was considered at the beginning of its study, but also the nervous, cardiovascular system, etc., which is a significant threat to human health (4 - 7). It is known that patients with pneumonia can experience anxiety and depression, which also has a significant impact on healthcare and care workers. At the same time, different pneumonias have different clinical courses and require different care (8, 9). Another study also reported changes in the olfactory bulbs in the development of severe pneumonia, even before the discovery of the COVID-19 pathogen (10). The COVID-19 pandemic has necessitated a detailed study of this issue due to the high prevalence of the disease and the growing burden on the healthcare system.

Eighty percent of cases of this disease have a mild or asymptomatic course, 15% of cases have a severe course and 5% of cases have a critical course. Usually, within a few months after recovery, all symptoms disappear, however, the amount of studies related to "post-COVID-19 syndrome" or "long-COVID-19" is increasing (11 - 13). Thus, the COVID-19 pandemic not only causes chronic psychological stress due to the likelihood of infection and strict quarantine measures but also may persist indefinitely after an illness due to probable complications. Since the beginning of the COVID-19 pandemic, the level of psycho-emotional stress among the population has increased, with direct consequences of the potential threat, such as possible disability, exacerbation of chronic diseases, and mortality. In addition, actions to reduce the spread of COVID-19 became a source of psychological

stress, including social distancing, quarantine, and closure of enterprises with subsequent loss of jobs (14 - 16). Pre-existing mental disorders may arise or worsen under such conditions, so it can be assumed that the psychological effect of a pandemic far exceeds the actual number of cases. It happens because of either the immediate consequences of the pandemic or changes in daily routine, eating behavior, sleep, and wakefulness, which lead to the development of distress (17). One of the most vulnerable segments of the population in the context of infectious pandemics and epidemics are healthcare workers (18, 19). This is probably due to staff reorganization, significant work intensity, direct contact with infected patients, and an increased risk of infecting yourself or close relatives (20). They are all at increased risk of coming into contact with a coronavirus patient regardless of whether the medical staff works in a specialized hospital that treats COVID-19 or in a regular health care facility. In addition, they are under all those factors that affect the psycho-emotional condition of the population (21, 22).

The psycho-emotional condition is an important component of human life, so any impact on it is extremely significant (23). Amidst the COVID-19 pandemic, it has become crucial to examine its impact on the psychological and emotional well-being of healthcare workers. Being the first line of defense against the virus, they are confronted with mounting responsibilities on a daily basis, leading to increased exhaustion, both physically and mentally. This emphasizes the possible danger posed to the overall healthcare system's effectiveness in times of the pandemic (24 - 26). Emotional burnout and chronic stress, difficulties in caring for seriously ill patients have already affected healthcare workers during other pandemics. However, the long-term consequences of the pandemic remain unknown (27 - 28). Healthcare and allied workers are increasingly exposed to long-term traumatic events in the context of the pandemic. The problem of moral damage causes a violation of the psycho-emotional condition, which can later lead to the development of severe symptoms of anxiety and stress (29). The identified evidence indicates the necessity for the COVID-19 pandemic of development and implementation of psychological support and psychoeducational methods to ensure their psycho-emotional condition and, as a result, reduce the burden on the healthcare system and improve the quality of care.

## METHODS AND MATERIALS

### Grouping

We conducted a study that included 100 healthcare workers (50 doctors and 50 nurses) and 50 physically and mentally healthy individuals during December 2020 - November 2021. The following recruitment was not conducting due to the full-scale Russian invasion of Ukraine that may affect healthcare system and mental health of the population in Ukraine (30, 31). From the surveyed respondents, we formed the following groups:

- experimental group 1 (EG 1) - doctors (n = 50);
- experimental group 2 (EG 2) - nurses (n = 50);
- control group (CG) - healthy respondents who did not work in the healthcare system (n = 50).

The range of the groups was calculated according to the Altman nomogram and the values were selected that provided a study power of 80% with a probability of error of the first kind  $\alpha = 0.05$ . The groups were put together according to age, gender, and level of education. All patients were informed about the possible benefits and outcomes of participation and gave informed consent to participate in the study.

### Inclusion/exclusion criteria

The inclusion criteria were employment in the healthcare system throughout the COVID-19 pandemic period, age – 18 - 59, and full vaccination against COVID-19 at the period of the survey. Exclusion criteria were age under 18 and over 59, the presence of severe somatic or mental pathology at the time of the survey, beliefs about the danger, course, and severity of coronavirus infection, which contradicted scientific evidence, the fact of self-appeal to a psychologist or psychotherapist according to the anamnesis, the respondent or his close relatives working as psychologist or psychotherapist, COVID-19 during the period of the last six months.

### Measuring stress levels

The stress level was measured using the Perceived Stress Scale (PSS-10), which addresses thoughts and feelings over the previous month. In-

dividual points range from 0 to 40, with points proportional to stress levels. Points from 0 to 13 indicate low stress, 14 - 26 points - medium, 27 - 40 points - high.

### Measuring the level of anxiety and depression

The Hospital Anxiety and Depression Scale (HADS) was used to rate the anxiety and depression levels. It includes the following parts (1 - assessment of the severity of anxiety, and 2 - assessment of the severity of depression). The total number of points from 0 to 7 points indicates the absence of clinically pronounced symptoms of anxiety or depression, 8 - 10 points - subclinical anxiety or depression, above 10 points - clinically pronounced signs of anxiety or depression.

### Measurement of improvement

Assessment of the improvement of the general condition of the respondents after the intervention was performed using the Global Patient Impression for Improvement (PGI-I) scale.

### Description of psychoeducational training

To improve the psycho-emotional state of health care workers, we proposed a program of psychoeducational training "PsyNotes", which was tested on the respondents. The psychoeducational program "PsyNotes", which we proposed in work with healthcare workers who had reported deteriorating psycho-emotional state in the context of the COVID-19 pandemic, contained three meetings that lasted 45 - 60 minutes and included group work, pair work and individual work. The group work methods are practical correctional and relaxation classes as well as game exercises (psychotechnical games and exercises, business games). The training was conducted in the Ukrainian language at the work place of respondents in person with all quarantine requirements kept in place in groups of 3 to 6 people. After a three-day training, we reassessed the level of perceived stress, anxiety and depression.

### Statistical analysis

For statistical analysis, we used MS Excel Office 2016 and EZR 1.34. Analysis of the data distri-

bution was performed according to the Shapiro-Wilk test. As all groups were normally distributed, we used one-way analysis of variance (ANOVA) with Sheffe's correction to compare quantitative characteristics between three independent groups. Qualitative variables are presented in the form of absolute (abs.) and relative (%) values. To compare categorical features, we used  $\chi^2$ - Pearson with Yates correction. To analyze the changes in the severity of signs of psycho-emotional state before and after training, we used the Mc-Nemar criterion with Edwards correction. The critical value of  $p$  was 0.05.

## RESULTS

In EG 1 and EG 2, the average value of total points on the PSS scale was within stress of moderate intensity, with  $18.29 \pm 3.14$  and  $24.67 \pm 2.57$  points, respectively, and in CG the average value was  $12.67 \pm 2.91$  points, which corresponded to low-intensity stress. Statistically significant differences were found between the studied groups ( $p = 0.009$ ). In EG 2, this indicator was statistically significantly higher compared to EG 1 ( $p = 0.024$ ) and CG ( $p = 0.003$ ), while in EG 1 it was higher compared to CG ( $p = 0.031$ ). In EG 2 and CG, the average value of total points of anxiety levels on the HADS scale was at the level of subclinical manifestations of  $9.11 \pm 1.98$  and  $8.89 \pm 2.46$  points, respectively, and in EG 1 it was  $12.37 \pm 1.73$  points, which reached the level of clinically pronounced manifestations. Statistically significant differences were found between the stud-

ied groups ( $p = 0.029$ ). In EG 1, this indicator was statistically significantly higher compared to CG ( $p = 0.027$ ). Statistically significant differences between groups EG 1 and EG 2 ( $p = 0.109$ ), as well as EG 2 and CG ( $p = 0.432$ ) were not detected. In all groups, the average value of the total score of depression on the HADS scale indicated the absence of depressive symptoms; namely in EG1, it was  $7.86 \pm 2.13$  points, in EG 2  $6.51 \pm 2.24$  points, and in CG, this value was  $7.91 \pm 1.92$  points. No statistically significant differences were found between the study groups ( $p = 0.338$ ). The distribution of levels of psycho-emotional disorders between the studied groups is presented in the Table 1.

EG 1 showed a low level of stress in 9 people (18%), medium in 24 people (48%), and high in 17 people (34%). Low levels of stress in EG 2 were found in 8 people (16%), medium in 19 people (38%), and high in 23 people (46%). In the CG, low and moderate levels were determined for 19 people (38%) and high for 12 people (24%). EG 1 revealed no anxiety manifestations in 22 people (44%), the presence of subclinical manifestations of anxiety in 11 people (22%), and clinically pronounced manifestations in 17 people (34%). Lack of anxiety in EG 2 was found in 29 people (58%), subclinical manifestations in 17 people (34%), clinical in 4 people (8%). Thirty-nine people (78%) of CG did not have anxious or depressive symptoms, 9 people (18%) had subclinical anxiety and 8 people (16%) had subclinical depression, and 2 people (4%) had clinical anxiety and 3 people (6%) had clinical depression. EG 1 re-

**Table 1.** Healthcare workers' psycho-emotional changes during COVID-19 pandemic

Indicator of psychological condition	Level	Groups			p-value
		EG 1 (n = 50)	EG 2 (n = 50)	CG (n = 50)	
Stress	Low	9 (18%)	8 (16%)	19 (38%)	0.034
	Moderate	24 (48%)	19 (38%)	19 (38%)	
	High	17 (34%)	23 (46%)	12 (24%)	
Anxiety	Absence	22 (44%)	29 (58%)	39 (78%)	0.002
	Subclinical features	11 (22%)	17 (34%)	9 (18%)	
	Clinical signs	17 (34%)	4 (8%)	2 (4%)	
Depression	Absence	35 (70%)	38 (76%)	39 (78%)	0.660
	Subclinical features	13 (26%)	11 (22%)	8 (16%)	
	Clinical signs	2 (4%)	1 (2%)	3 (6%)	

**Table 2.** Dynamics of the psycho-emotional condition of EG 1 respondents after psycho-educational training

Indicator of psychological condition	Level before	Level after		p-value
		Low/Absence (target)	Moderate/high/subclinical/clinical	
Stress	Low	9 (18%)	32 (64%)	< 0.001
	Moderate/high	2 (4%)	7 (14%)	
Anxiety	Absence	12 (24%)	6 (12%)	0.003
	Subclinical/clinical	3 (6%)	19 (38%)	
Depression	Absence	25 (50%)	10 (20%)	0.638
	Subclinical/clinical	8 (16%)	7 (14%)	

vealed no depressive manifestations in 35 people (70%), the presence of subclinical manifestations of depression was found in 13 people (26%), and clinically pronounced manifestations in 2 people (4%). The absence of depression in EG 2 was found in 38 people (76%). There were statistically significant differences between the studied groups, namely EG 1 and EG 2 were characterized by increased stress levels ( $\chi^2 = 10.47$ ,  $df = 4$ ,  $p = 0.034$ ), whereas in the representatives of EG 1 more typical clinically pronounced manifestations of anxiety were seen ( $\chi^2 = 17.21$ ,  $df = 4$ ,  $p = 0.002$ ). There were no statistically significant differences in the distribution of the frequency of detection of signs of depression between the studied groups ( $\chi^2 = 2.42$ ,  $df = 4$ ,  $p = 0.660$ ).

Assessment of the level of perceived stress after the psychoeducational training program found that the average score on the PSS scale in EG 1 decreased to  $11.67 \pm 2.36$  points and in EG 2 to  $13.87 \pm 2.84$  points, which showed statistical significance ( $p = 0.034$  and  $p = 0.019$ , respectively). Assessment of the level of stress after the psychoeducational program demonstrated the decrease in EG 1 to  $7.13 \pm$

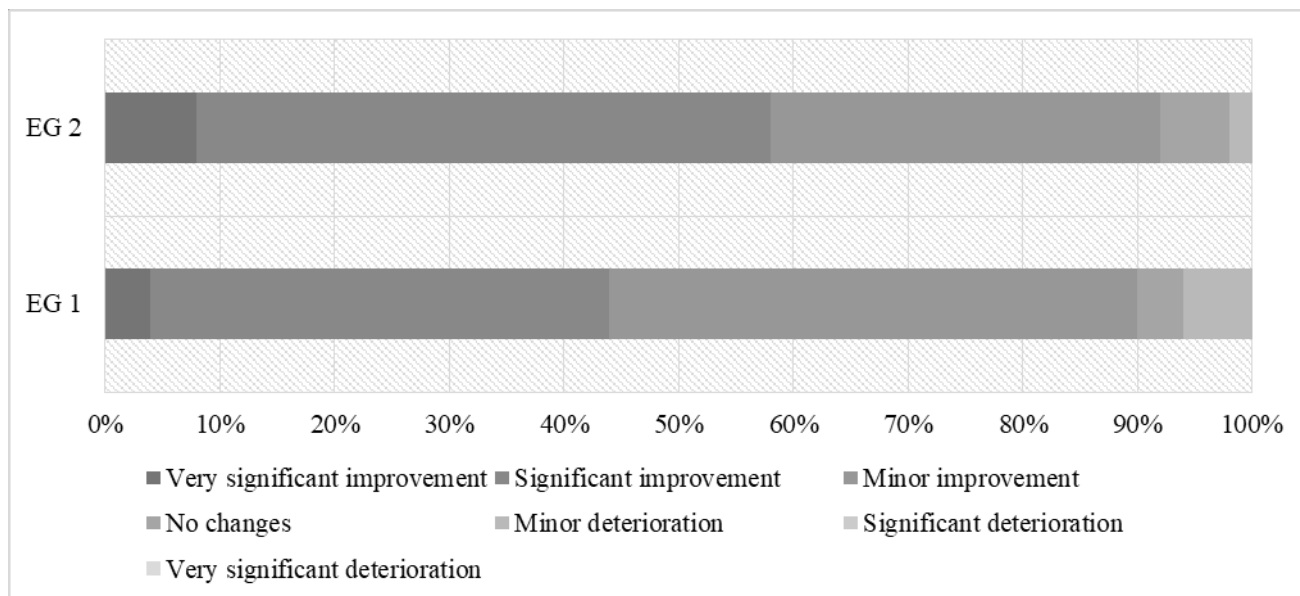
1.68 points, in EG 2 to  $6.26 \pm 1.59$ , which was statistically significantly different ( $p = 0.039$  and  $p = 0.028$ , respectively). The level of depression remained unchanged, which was confirmed by the absence of statistically significant changes in both experimental groups. The level of depression in EG 1 after the program was  $7.17 \pm 1.89$  points and in EG 2 it was  $6.49 \pm 2.07$  points. In EG 1, there was a significant reduction in the level of stress and anxiety to the level of the selected optimum ( $p < 0.001$  and  $p = 0.003$ , respectively), which is given in Table 2.

EG 2 identified a tendency to reduce the level of stress and anxiety ( $p < 0.001$  and  $p = 0.019$ , respectively), which is shown in Table 3.

According to the PGI-I scale, EG 1 mostly characterized their condition as "minor improvement", while EG 2 as "significant improvement". The distribution of respondents' answers by groups is shown in Figure 1. In EG 1, a very significant improvement was reported by 2 (4%) respondents, significant by 20 (40%), minor by 23 (46%) respondents, no change by 2 (4%), slight deterioration by 3 (6%)

**Table 3.** Dynamics of the psycho-emotional condition of EG 2 respondents after psycho-educational training

Indicator of psychological condition	Level before	Level after		p-value
		Low/Absence (target)	Moderate/high/subclinical/clinical	
Stress	Low	13 (26%)	29 (58%)	< 0.001
	Moderate/high	1 (2%)	7 (14%)	
Anxiety	Absence	7 (14%)	14 (28%)	0.019
	Subclinical/clinical	4 (8%)	25 (50%)	
Depression	Absence	32 (64%)	6 (12%)	0.764
	Subclinical/clinical	5 (10%)	17 (34%)	



**Figure 1.** Subjective assessment of the improvement of general well-being by health professionals after psychoeducational training

respondents, and in EG 2 very significant improvement was indicated by 4 (8%) respondents, significant by 25 (50%), minor by 17 (34%), no change by 3 (6%), and minor deterioration by 1 (2%).

There were no statistically significant differences between EG 1 and EG 2 in the distribution of subjective assessment of self-improvement ( $\chi^2 = 3.32$ ,  $df = 4$ ,  $p = 0.506$ ). At the same time, the absence of respondents who would report a significant or very significant deterioration was noteworthy.

## DISCUSSION

The world has faced an unprecedented situation with the COVID-19 pandemic. Not only has the disease caused significant harm to those affected, but it has also led to a very long period of physical and social isolation. This experience was completely new for the world, and its impact was felt by everyone (32). It was found that nurses and medical doctors had a higher level of stress during the COVID-19 pandemic than non-medical workers. This feature might be related to a combination of personal and general influence factors. It can be both the fear of getting infected and stress from the social isolation, as well as stigmatization and rejection by others because of their specialty (33). We reported that nurses had a higher level of perceived stress, which was determined in previous studies (34).

The highest level of anxiety was measured in physicians compared to nurses and non-medical professionals. This finding may occur due to greater responsibility for patients' life and a lot of contact with their relatives. At the same time, anxiety could be a part of the post-COVID-19 syndrome and enhanced by social factors. In conscious living things, such as humans, anxiety is recognized as an adaptive response. Aside from the emotional component, cognitive processing of "dangerous" stimuli has a significant role in anxiety. This cognitive component is linked to earlier anxiety experiences, such as cognitive worry about oneself, prospective consequences, and anticipatory negative future effects (35). Anxiety disorders in the general population tend to be chronic and, as a result, direct to longitudinal psychological complications (36). Affective syndromes also may be as a result of somatic diseases which should be noticed before psychological interventions (37). Intriguingly, our study did not show any significant differences in depression levels between groups. A recent meta-analysis demonstrated a significant prevalence of anxiety and insomnia in 23.2% and 22.8%, respectively, and it was comparable to the rates for the Chinese population as a whole. In addition, the authors found the prevalence of insomnia in healthcare workers in the context of the COVID-19 pandemic to be almost 40% (38). It is well known that sleep disorders are as-

sociated with a variety of mental disorders, including aggression, anxiety, depression, schizophrenia, fatigue and cognitive impairment (39 - 41). Thus, deterioration in sleep quality and duration may act as potential mediators of mental health and be potential additional targets for intervention.

Governments are organizing various support services for healthcare workers due to the pandemic of COVID-19 organizing psychological support centers and implementing some interventions. It was studied that individual programs contained more psychoeducation and cognitive-behavioral therapy approaches, while group programs consisted mainly of psychoeducation and mindfulness techniques. Relaxation methods and others occupied the smallest share in both types (42 - 43). Previously, the role of psychoeducational interventions in the pandemic was emphasized, but their effectiveness in healthcare workers was not evaluated (44). We demonstrate the effectiveness of the psychoeducational program for reducing stress and anxiety in doctors and nurses after three days. It should be implemented in the work process in hospitals and support centers for the improved quality of psycho-emotional condition of healthcare workers, decreasing the psychosocial impact of pandemic states, and enforcing good medical care.

We ought to notice that our study was limited to healthcare professionals in one country. Thus, the psycho-emotional condition could also be influenced by socio-economic factors, which must be taken into account in the planning of future studies. Further research should focus not only on efficacy but also safety, feasibility, and long-term outcomes and include data of social, economic, and other possible confounders.

## CONCLUSION

During the COVID-19 pandemic, in healthcare workers, the level of stress was higher by 1.5 times

compared to non-medical specialties, the level of anxiety increased by 2 times, and the level of depression was not significantly different. We developed a psycho-educational training program "PsyNotes" for training healthcare workers, which contains 15 exercises and provides three meetings of 45 - 60 minutes. The reduction of stress and anxiety in both doctors and nurses was revealed after the implementation of the proposed psychoeducational program. The subjective assessment of the improvement of the general condition shows its positive dynamics after the program, indicating the effectiveness of the proposed psychoeducational methodology for improving the psycho-emotional condition of both doctors and nurses, and demonstrates the possibility of its application in the work process of healthcare institutions.

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None

### Declaration of Interest

Authors declare no conflict of interests.

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### Ethics statement

Study protocol was approved by local ethical committee of Poltava State Medical University.

### Informed consent

All participants have written informed consent form.

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# Sprovođenje psihoedukativnog treninga s ciljem smanjenja uticaja pandemije kovida 19 na zdravstvene radnike

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## SAŽETAK

**Uvod.** Zdravstveni radnici bili su u velikoj meri izloženi dugotrajnim traumatskim događajima u toku pandemije kovida 19.

**Metode.** Sprovedena je studija koja je obuhvatila 100 zdravstvenih radnika i 50 zdravih osoba. U proceni psihološkog stanja ispitanika koristili smo *Perceived Stress Scale*, *Hospital Anxiety and Depression Scale*, kao i *Global Patient Impression for Improvement*. S ciljem poboljšanja psihoemocionalnog stanja zdravstvenih radnika, predložili smo program psihoedukativnog treninga koji je sproveden na radnom mestu. Nakon toga, ponovo je procenjen nivo percipiranog stresa, anksioznosti i depresije.

**Rezultati.** Tokom pandemije kovida 19, nivo stresa i anksioznosti kod zdravstvenih radnika bio je viši nego kod ispitanika ostalih profesija, dok se nivo depresije nije značajno razlikovao. Utvrđeno je smanjenje stresa i anksioznosti. Subjektivna procena poboljšanja opšteg stanja ukazala je na pozitivnu dinamiku nakon psihoedukativnog treninga i kod lekara i kod sestara.

**Zaključak.** U radu je prikazana efektivnost predložene psihoedukativne metodologije s ciljem poboljšanja psihoemocionalnog stanja zdravstvenih radnika za vreme pandemije kovida 19.

**Ključne reči:** zdravstveni radnici, kovid 19, anksioznost, depresija, psihološki stres