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DISTRESS AS A COMPONENT OF PATHOGENESIS OF COVID-19 DURING THE FIRST WAVES OF PANDEMIC

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ABSTRACT

The need for psychological aid for a full recovery after COVID-19, primarily overcoming negative emotional consequences, anxiety disorders, which can increase the risk of developing fears, panic conditions, etc. relevant among the psychological research. The aim of our study was to investigate the self-assessment of the mental and somatic state of people who have had COVID-19. There are 104 respondents participated in the study, 81,7% of whom were women.

Before disease own emotional state was assessed as “good” or “very good” by 71,1% of respondents: 44,2% and 26,9%, respectively. During the height of the illness, this percentage decreases dramatically, becoming 14,3%. Indexes of assessing one's own emotional state at the time of the survey increase, but do not reach the level observed before illness: 54,7% of respondents rated their condition as “good” (26,9%) and “very good” (27,8%). At the same time, during the height of the disease, 59,6% of the respondents rated their emotional state as “very bad”, “bad”, or “moderate”. Of these, 19,2% rated their emotional state as "very bad", 18,2% - “bad”, and 22,1% - “moderate”. Among the mental disorders at the time of illness, anxiety (62,5%), depression (51%), fear (of the future, death, infecting others) (47,1%), apathy (45,2%), mood swings (34,6%), loss of willpower (33,6%) have been prevailed. On the moment of the survey, mood swings (30,7%), depression (29,8%), anxiety (28,8%), apathy (19,2%) sudden unpleasant memories (19,2%), loss of willpower (18,2%) have been dominated.

Among the somatic disorders which were present in participants during the disease increased tiredness (87,5%), physical weakness (86,5%), loss/changes in smell and/or taste (74%), sleep disorders (61,5%), deterioration of memory, attention, thinking, willpower (60,5%), loss of appetite (58,6%) had been prevailed. At the time of the survey, increased tiredness (50%), physical weakness (33,6%), deterioration of memory, attention, thinking, willpower (31,7%), and sleep disorders (26,9%) were still quite pronounced.

Among the factors that helped respondents to recover from the illness, the first places belong to the decrease in stress and having more rest (66,3%), emotional support from family and friends (64,4%), receiving the right information about the disease, to understand what was going on, and having awareness about the ways of the disease overcoming (50%). A significant part of the respondents was helped by self-control over own thoughts and emotions such as meditation and prayers (40,4%) and the experience of other people's recovery (40,4%). For a certain part of people (26%), work with a psychologist or psychotherapist was useful to overcome COVID-19. Physical and breathing exercises were useful for 44,2% of our responders. Surprisingly, the last place in the disease overcoming belongs to ways of somatic health restoration, such as the use of medicines (18,3%).

Our results suggest that the first waves of COVID-19 disease were characterized by a strong impact of distress which induced a high level of social tension, affected mental sphere, provoking anxiety and worries. Therefore, reduction in stress, support from friends and family, and receiving the right information about the disease played a greater role in recovery than medication.

Key words: distress, COVID-19, mental state, somatic symptoms, recovery

INTRODUCTION

The sudden onset and rapid spread of COVID-19 was accompanied by the presence of a strong negative emotional component that determined a high level of

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psychological tension in societies. The active involvement of psychologists was definitely required from the first months of the pandemic. Their activity could normalize the state of mental health both in society as a whole and for each individual. The first psychological studies stated that COVID-19 patients had such non-infectious symptoms as depression, anxiety, precautionary behaviour, boredom (González-Sanguino et all., 2020; Varga et all., 2021; Gloster et all., 2020; Manchia et all., 2022). According to the Global Burden of Disease Resource center 76, 2 millions of peoples were affected by anxiety disorder and 53,2 millions by depressive disorder due to COVID-19 pandemic (COVID-19 Mental Disorders Collaborators, 2021). Despite the overall level of anxiety has been decreased gradually over the following months after the beginning of the pandemic (Varga et all., 2021; Bendau et all., 2021), mental disorders were still present as a part of the clinical picture. Furthermore, the higher level of depression was observed, the more pronounced somatic symptoms were diagnosed and vice versa. The time of recovery was delayed in such people (Liyanage-Don et all., 2021). Besides, the governmental interventions did not result in changes in the levels of worries in any of societies (Varga et all., 2021). This indicates that the mental stress was characterized by a strong personal connotation.

A strong impact of the emotional component during the first waves of COVID-19 is also indicated by the fact that people who had even minor symptoms that were on the list of COVID-19 signs immediately hurried to see a doctor or take a test, although they showed no signs of illness on physical examination (Rubin & Wessely, 2020). Against this background, after the illness, patients were prone to a number of mental disorders including anxiety, depression, and sometimes psychosis and suicidal thoughts. Based on the above, it is obvious that the distress caused by social tension, to a greater extent than by the disease itself, is one of the key aspects of the appearance of these mental disorders.

Although, according to some surveys, in particular in our previous study (Bondarenko et all., 2021), the positive effects of quarantine were also noted, such as the opportunity to take a break from the hectic lifestyle, increasing the time for rest and staying at home with family, its negative effects were occupied a significant place. Abrupt social restrictions, isolation from friends, inadequate information, financial loss acted as triggers that initiated mental discomfort in people. For those, who got sick with COVID-19, fear for their lives, health consequences, infecting others were added. All these factors can be considered as stressors (Brooks et all., 2020). As a result, boredom, confusion, anger, frustration was provoked and such mental state was superimposed on somatic symptoms.

Therefore, the need for psychological assistance for a full recovery after suffering COVID-19, primarily overcoming negative mental consequences, which can increase the risk of developing fears, panic and delay the moment of recovery is important. In addition, the identification of the factors necessary for mental recovery is a potential basis for the development of methods to overcome the negative impact of the pandemic, as well as recovery from COVID-19.

Despite the time that has passed since the beginning of the pandemic, data on mental recovery from COVID-19 is still quite limited. Also, we did not find studies that indicated what exactly helped people to restore mental balance and overcome the distress caused by the pandemic. The aim of our study was to estimate the self-assessment of the somatic and mental state of people who had COVID-19 disease, and to determine the need, as well as factors important for mental and somatic recovery.

METHOD

The study was conducted by sending a link on the on-line questionnaire during April-May 2021. The statements of the questionnaire were divided into two blocks regarding to the self-assessment of mental and somatic state. The questionnaire was designed in such a way as to explore the impact of COVID-19 on mental health. The criterion of the impact evaluation was personal experience. Information about the study was published on social networks and sent personally. Higher activity was observed among respondents who received the address link. There were 104 respondents participated in the study, 81,7% of whom were women. The average age of the participants was 35 years, the greatest activity has been observed in the age group between 30 to 50 years. The participants declared absence of chronic somatic disorders (such as

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thyrotoxicosis, hypertension, diabetes mellitus, etc.), which can cause the symptoms noted in the questionnaire. For the most participants (52,9%), the disease proceeded in a mild form, 41,3% suffered moderate form, and six people suffered the severe form of the disease, what is 5,8% of all respondents. Almost half of the participants (56,7%) were treated without hospitalization but with appealing to a doctor's consultation, 26% visited medical institutions being treated on an outpatient basis, and 13,5% were ill without treatment. The disease with hospitalization was noted in 4 people, what is 3,8% of the respondents. The study was conducted in April-May 2021, it means that for the half of the participants (51%), the disease took place in October-November 2020, when a second wave of pandemic in Ukraine occurred, with a sharp increase in the number of disease cases. For this group, at the time of survey, a half a year or more had passed since the moment of the disease. For some people (18,3%), the disease occurred in December-January before and during the announcement of a hard lockdown. For this group, 3-4 months had passed since the moment of the disease. For others (21, 2%), the disease occurred in February-March 2021 when hard lockdown was canceled but restrictions were still preserved. For these people, 1-2 months passed since the moment of the disease. And, less than a month from the period of illness passed only for 9,6% of participants. All respondents were informed about the purpose and anonymity of the survey and gave their agreement to participate.

RESULTS

In the beginning respondents were asked to estimate own mental state before the disease, during the height of the disease, and at the time of the survey.

Before the disease 71,1% of responders had assessed own mental state as "good" (44,2%) or "very good" (26,9%) (Fig.1). At the time of illness, this percentage had significantly decreased and amounted to 14,3%: 10,5% rated their mental state as "good" and 3,84% as "very good". Indexes of assessing one's own mental state at the time of the survey raised, but did not reach the level observed before the disease: 54,7% of respondents rated their mental state as "good" (26,9%) and "very good" (27,8%). At the same time, during the height of the disease, 59,6% of the respondents rated their mental state as "very bad", "bad", or moderate. Of these, 19,2% rated their mental state as "very bad", 18,2% – "bad", and 22,1% – moderate ("rather bad, than good"). Hence, at the time of the survey respondents had not yet completely recovered from the illness.

Among the somatic disorders which were present in participants during the disease fatigue (87,5%), physical weakness (86,5%), loss/changes in smell and taste (74%), sleep disorders (61,5%), deterioration of memory (60,5%), appetite disorder (58,6%) had been prevailed (Fig. 2). At the time of the survey, fatigue (50%), physical weakness (33,6%), deterioration of memory (31,7%), and sleep disorders (26,9%) were still quite pronounced. Consequently, the time elapsed since the disease was insufficient for the ma-

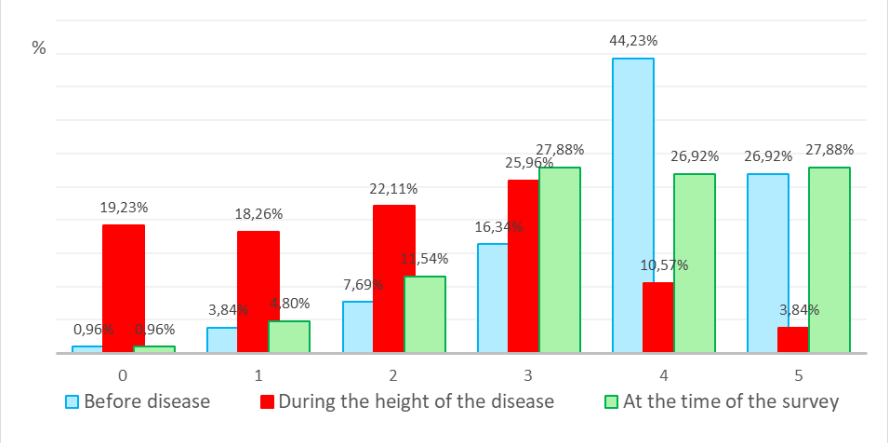

Figure 1. Responders' assessment of own mental state: where 0 – very bad, 1 – bad; 2 – rather bad, than good; 3 – rather good, than bad; 4 – good; 5 – very good

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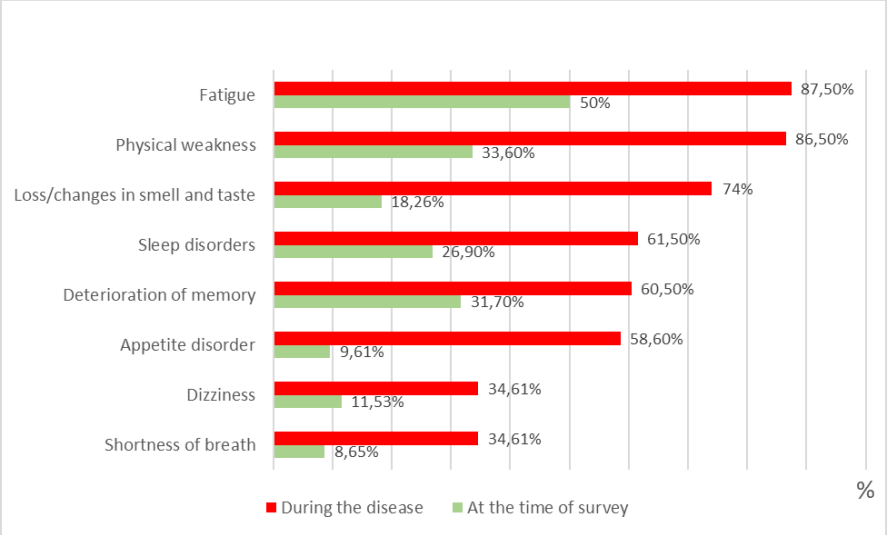

Figure 2. Somatic disorders experienced by respondents during the disease

jority of respondents and they couldn't state a complete somatic recovery.

Among the disorders of the mental sphere at the time of the disease, anxiety (62,5%), depression (51%), fear (47,1%), apathy (45,2%), mood swings (34,6%), loss of willpower (33,6%) had been prevailed (Fig. 3). At the time of the survey, mood swings (30,7%), depression (29,8%), anxiety (28,8%), apathy (19,2%), sudden unpleasant memories (19,2%), loss of willpower (18,2%) had been dominated. Hence, the obtained results indicate that complete mental recovery from the disease has not been occurred.

Also, the questionnaire asked participants to evaluate from "0" ("not at all") to 10 ("totally yes") how they *estimate own recovery* after COVID-19 at the current moment. Considering that the state of complete recovery can confidently be assessed at 10 points, only 31,5% of participants noted complete somatic recovery and 30,8% complete mental recovery. The rest of the participants, to varying degrees, believed that they still have not fully recovered from the disease (Fig. 4).

The more detailed analysis of the data revealed that high scores (9 and mostly 10) in assessing of the degree of own somatic and mental recovery were given by those who further noted that they did not require any further recovery. However, respondents who stated such a need also rated their degree of recovery as high or close to high, expressing in points from 7 to 10. It is possible that as a recovery people understand the improvement or disappearance of prominent symptoms. Low scores (1-5 points) for assessing of own somatic and mental recovery were noted by 4,8% of the total number of respondents. This corresponds with the number of participants who had a severe form of the disease. It should be noted that respondents who noticed a greater need in somatic recovery

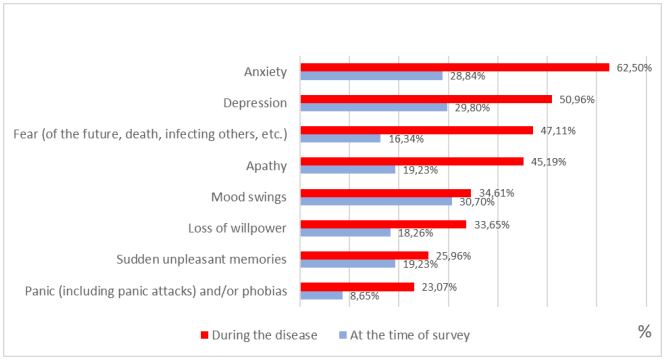

Figure 3. Mental disorders experienced by respondents during the disease

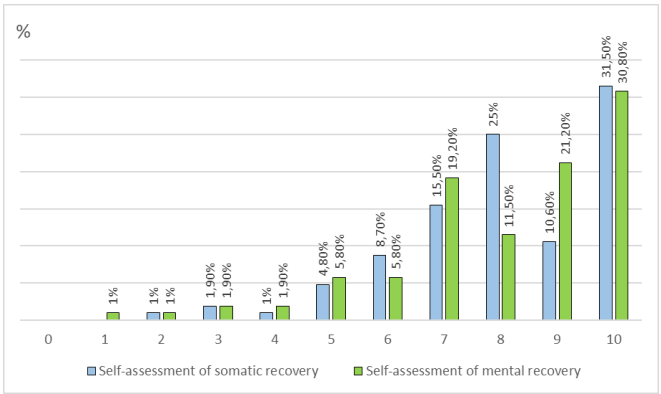

Figure 4. Self-assessment of the degree of somatic and mental recovery from COVID-19, where 0 – "not at all", 10 – "totally yes"

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demonstrated higher scores in the degree of mental recovery, although this difference ranged from 1-2 points. Those, who needed mental recovery scored more higher own somatic recovery, and the difference was slightly higher compared to the previous group and took to 1-3 points.

Also, the respondents were asked to note the *need* for further recovery after the illness (data not shown). The percentage of those in need of further recovery is turned out to be in concordance with previous results. Such a need was indicated by 69,2% of the respondents. Almost a half of these people (32,7%) require both somatic and mental recovery, 25% – mainly somatic and 11,5% – primarily only mental recovery. Approximately a third of respondents (30,8%) noted that they do not need any rehabilitation. Hence, our responders declare a need of somatic or mental recovery. This data indicates that time elapsed from disease was not enough to provide complete recovery.

plained by the fact that the survey was conducted among residents of a large metropolis who could well have used psychological help or practiced such appeals before the pandemic and this solution of mental problems was familiar to them. The last place in the disease overcoming belongs to the use of medicines (18,3%).

The obtained results demonstrate that although for most of our participants six months or more have passed since the disease, they still report the presence of both physical and mental symptoms associated with the illness. Anxiety, depression, mood swings remain dominant, as do fatigue, physical weakness, memory, and sleep disturbances.

DISCUSSION

The symptoms of somatic and mental disorders discussed in our survey can be divided into three groups: as a result of the virus action, consequences of distress, and

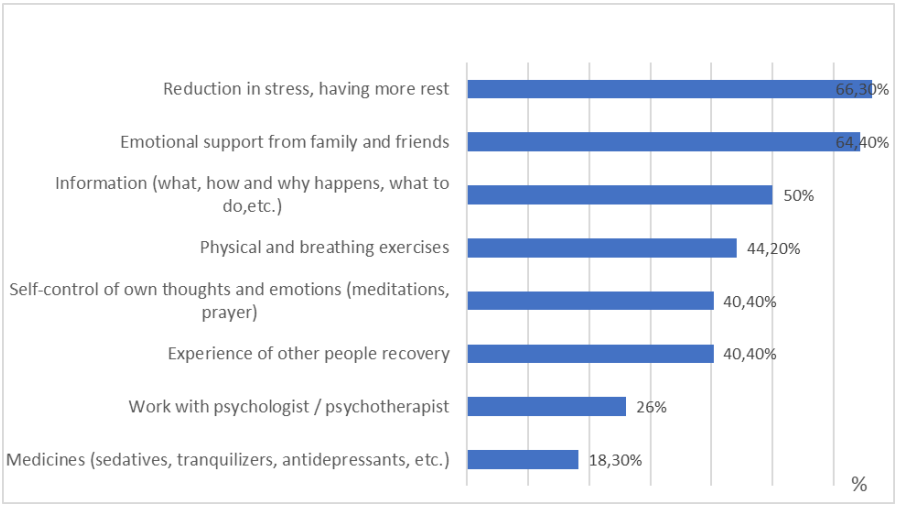

Figure 5. Factors that helped respondents to recover from COVID-19

Among the factors that helped respondents to recover from the illness, the first place belongs to the decrease in stress and having more rest (66,3%), as well as emotional support from family and friends (64,4%). For half of the participants (50%) was important to receive information about the disease, to understand what was going on, and having awareness about the ways how to overcome it. A significant part of the respondents was helped by physical and breathing exercises (44,2%), self-control of own thoughts and emotions (40,4%), and the experience of other people's recovery (40,4%). For a certain part of people (26%), work with psychologist or psychotherapist was useful to overcome COVID-19. This result could be ex-

which can be attributed to both the effects of the virus and distress. The first group includes loss of smell and taste, dizziness, shortness of breath. Anxiety, depression, fear, apathy, mood swings, sudden unpleasant memories, panic, loss of willpower belong to the second group. And the last one contains fatigue, physical weakness, sleep disturbance, memory impairment, appetite disorders. Since, in our research we are interesting in mental sphere, we will focus on the symptoms which belong to the second and third groups. This also applies to the ways that helped our respondents to recover. Many of them could be described as coping strategies in dealing with stress. The use of medica-

tions, including sedatives, is in the last place. But the most helpful were emotional support, information availability, control of one's own thoughts and emotions, the experience of other people's recovery, work with a psychologist. They describe attempt of our participants to restore mental balance. Reduction in stress, having more rest, physical and breathing exercises belong to factors which can be attributed to both somatic and mental recovery. All the factors, characterized by a high percentage, describe the mental recovery to a greater extent than somatic one. They do not directly affect the virus in any way, but rather emphasize the strong involvement of the mental sphere in the pathogenesis of COVID-19 of the first waves.

Our data are consistent with other studies that COVID-19 disease was accompanied by mental health problems such as anxiety, depression, loneliness, irritability, emotional exhaustion, and insomnia (Pandey et all., 2021; Al Dhaheri et all., 2021; Yang et all., 2020; Wang C. et all., 2020; Chen et all., 2021; Paz et all., 2020). Respondents of various studies characterized the psychological impact of the pandemic as moderate or severe, with pronounced symptoms of depression and anxiety (Chen et all., 2021; Wang C. et all., 2020; Pérez-Cano et all., 2020). Higher levels of emotional distress, anxiety, and depression was observed in females and people with higher degrees of education (Wang C. et all., 2020; Chen et all., 2021; Hu, Ye, & Tan, 2021; Pérez-Cano et all., 2020).

Obviously, that the predominance of such states is a sign of a significant influence of stress factors. First of all, one can single out sudden social restrictions for which people were not ready and they never had such a previous experience. Therefore, it was a powerful stressor, what, moreover, can be confirmed by used copings. The emotional support from family and friends comes first. It is known that the emotional support of loved ones is one of the most common coping strategies in dealing with stress, as well as, having more time for rest, what was noted by our participants too. Data of other studies also indicates a significant contribution of communication with loved ones likewise spending more time to rest and relax. Social support from family and friends has been associated with increased resilience while coping with COVID-19 (Al Dhaheri et all., 2021; Killgore et all., 2020; Nitschke et all., 2021; South et all., 2020; Prime, Wade, & Browne, 2020). Apparently, that social restrictions blocked one of the powerful support channels and the negative mental state was superimposed on the disease.

Another stressful factor of the first waves of the pandemic was the lack of information. The deficiency of accurate information, significant media noise, the spread of myths regarding the emergence of COVID-19 provoked a high level of fear as a natural reaction to the unknown and new. As a result, fear and anxiety weakened the ability to think critically. A contagion by negative emotions which pushed people to focus their thoughts in anticipation of the negative had been observed. It was noted that during the first waves of the pandemic, people desired additional information about COVID-19 and having the right information was a protector from the anxiety (Wang C. et all., 2020; González-Sanguino et all., 2020). In our study, the availability of information occupies a leading place. This was cited as a factor that helped with recovery from COVID-19 by the half of our respondents. What is obvious, because awareness relieves tension and helps to calm down about various stressful situations. Aforementioned confirms one more stress factor responsible for the presence of distress in the pathogenesis of COVID-19. Other stressors include financial loss, fear for life and health, to be infected or infecting others etc. are not mentioned in our survey.

Distress may well have influenced the course of COVID-19 and exacerbated or triggered some of its symptoms. In particular, 61,5% of our respondents indicated sleep disorders. This fact can be considered as a direct effect of virus and as a sign of distress. Sleep disorders have been stated by many studies not only during the disease and post recovery period but in most people during a pandemic at all (Taquet et all., 2021; Bhat & Chokroverty, 2022; Jahrami et all., 2022; El Sayed et all., 2021; Li et all., 2023; Lin et all., 2021; Wang S. et all., 2020). Sleep problems were usually associated with higher levels of distress (Merrill, 2022) and this tendency was kept during the COVID-19 pandemic (Alimoradi et all., 2021). Given the close relationship between sleep disorders and distress (Han, Kim, & Shim, 2012), treating the former may well reduce the level of the latter. It is known that sleep and stress have common humoral links. The activity of the hypothalamic-pituitary-adrenal system is suppressed

at the beginning of sleep, however, in the morning hours, closer to awakening, the level of adrenocorticotropic hormone increases sharply, determining the sleep duration (Vgontzas et all., 2001). Hence, activation of this system during the stress maintains the alertness state of organism. In one study has been found that insomnia and immunosuppression under stress shared common neuro-humoral mechanisms (Li et all., 2020). Therefore, the relationship between mental state and the immune defense of the body may be more significant. It is known that states such as depression, loneliness, which were especially present during isolation, suppress the immune system (Bzdok & Dunbar, 2020). The important role of astrocytes in the pathogenesis of stress-induced insomnia has also been noted (Birch & Vanderheyden, 2022). Interestingly, that these cells are directly affected by the SARS-CoV-2 virus and the long-term effects of COVID-19 may well depend on their dysfunction (Andrews et all., 2022; Tavčar et all., 2021).

Symptoms that can be attributed to both the direct impact of the virus and the consequences of distress include appetite disturbance, which was indicated by 58,6% of our respondents. It is highly likely that this symptom is largely determined by the influence of the virus and is directly related to the loss of smell and taste, what was indicated by 74% of respondents. After all, ageusia and anosmia make it difficult to assess the characteristics of the consumed food. This is what is associated with a decrease in appetite during the acute phase of COVID-19 and the recovery period (Høier, Chaaban, & Vad Andersen, 2021; Chaaban, Høier, & Vad Andersen, 2021). Participants of the studies noted a lack of pleasure related to food intake. Although, to some extent, distress could still influence the decrease in appetite, realizing its effects through common hormonal pathways, namely the aforementioned hypothalamic-pituitary-adrenal system. Corticotropin-releasing hormone, produced by the paraventricular nucleus of the hypothalamus, is a strong anorexigenic substance, like glucocorticoids, the anorexigenic effects of which has been established precisely when they released during stressful conditions (Ans et all., 2018). We also assume the presence of a component of the individuality and stress reactivity of each. For some, the loss of smell and taste may have exacerbated the effects of other stressors and affected not only appetite but also the level of distress.

Deterioration of memory, reported by 60,5% of our respondents, is an important consequence of COVID-19. Of course, the neurotropism of the virus and the possible deterioration of cognitive functions caused by it are widely explored. Brain imaging studies found in people who recovered from COVID-19 structural abnormalities of brain such as decreased cerebral gray matter volume and white matter hyperintensities as well as hypometabolism in the frontal, parietal and temporal regions (Shan et all., 2022). These signs may relay to memory dysfunction in COVID-19 patients, although the possible causative links are still unknown. Some researchers attribute this to the effect of medications. A group of subjects treated with steroids and antibiotics complained on memory impairment more often (Ahmed et all., 2022). This study notes the interesting fact that people who recovered 6-12 months back were 6,6 times more likely to have memory complaints than the people who recovered 3 to 6 months ago.

In turn, a significant level of distress observed during the first waves of quarantine isolation could also provoke memory impairment, by itself or in combination with the virus. Regarding the fact of memory deterioration as a result of COVID-19, it may be reasonable to talk about the comorbidity of the virus and distress. Stress itself is known to impair memory. At the molecular level, it had been established that stress characterized by an increase in the activity of the enzyme protein kinase C in the prefrontal cortex which was accompanied by a significant deterioration of biochemical, behavioral, and electrophysiological measures of memory (Hampton, 2004). Severity of morpho-functional changes in the hippocampus depends on stress levels. Mild stress stimulates the hippocampal activity and characterised by increased synaptic activity and chemical changes at the level of neuromodulators. Moderate stress reduces the hippocampal activity, deteriorates synaptic plasticity and neurons metabolism. Strong stress is associated with suppression of hippocampal activity and morphological changes such as dendritic reorganization, reduced density of dendritic spines and size of soma. Chronic stress characterized by significant inhibition of functional activity and signs of neurotoxicity (Kim, Pellman, & Kim, 2015). Furthermore, a high density of receptors for such stress hormones as corticotropin-releasing hormone and cortisol is observed in the hippocampus (Justice et all., 2008). Stress-

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ful conditions associated with a significant decrease in declarative memory performance (Lupien et all., 1997). Intriguingly, that cortisol level significantly raised in the experimental group with reduced declarative memory in the anticipation of the stress. The authors suggested that it is the expectation of stress (in our case, the expectation of the negative consequences of COVID-19) that may play a pivotal role in the stress-induced decline in declarative memory (Lupien et all., 1997). Against this backdrop, there is encouraging evidence from studies on monkeys that successful coping with stress stimulates neurogenesis in the hippocampus what creates a potential basis for the development of psychotherapeutic methods for the prevention of memory deterioration (Lyons et all., 2010).

Continuing the idea regarding the negative impact of stress on the morphology and functioning of brain structures, we should mention such concept as neuroplasticity. It is known that acute and chronic stress, as well as depression, negatively affect neuroplasticity, causing structural changes in neurons, particularly, neuronal atrophy and synaptic loss in the medial prefrontal cortex and hippocampus (Price & Duman, 2020; Sheline et all., 1999). Especially, stress-induced changes are prominent in the amygdala and hippocampus (McEwen, Nasca, & Gray, 2016). Amygdala is a unique structure which directly activated by stress and is responsible for generating negative emotions and negative behavior triggered by stress (Shin et all., 2005). It is through the amygdala that the stress-induced activation of the hypothalamus occurs and it launches the hypothalamic-pituitary-adrenal system and cortisol release. It also affects the prefrontal cortex, ensuring that negative emotional memories are retained. Due to the two-way connections, these memories provoke the amygdala to continue signaling to the hypothalamus (McEwen, Nasca, & Gray, 2016). Moreover, chronic stress makes the amygdala hypersensitive, potentiates its reactivity by increasing the number, size, and arborization of dendrites in excitatory neuron types (Vyas et all., 2002). Thus, with the constant generation of negative thoughts associated with a stress factor, the release of hormones continues and the body is in a state of stress even in its absence. In contrast, there is evidence that the prefrontal cortex can turn off the stress response if it believes the subject is in control (Amat et all., 2006). The hippocampus, as it was mentioned, is also a target of the stress response, but in contrast to the amygdala, its size decreases, dendritic spines become shorter and less branched (Vyas et all., 2002). Such changes are connected to the influence of excess glutamate and glucocorticoids (Popoli et all., 2011).

The brain becomes the target of the stress response it has launched and is itself affected by a destructive effect. Stress hormones alter its architecture, protein expression, synapse formation, and synaptic transmission, generally inhibiting neuroplasticity (McEwen, 2007; Wang F. et all., 2017). Cortisol enhances the effects of catecholamines in the prefrontal cortex and amygdala (Barsegyan et all., 2010). A vicious cycle is formed when the stressed and altered brain continues to trigger the secretion of stress hormones. The neuroplasticity of the brain as its ability to adapt in this sense can be considered as neurotoxicity opposite to positive neuroplasticity, when it comes to the formation of new structural connections, the synthesis of signaling proteins, receptors, etc.

Only successful interaction with new stressors contributes to the development of neuroplasticity, underlies the formation of preprogramming of neural circuits and the creation of new, more effective ones. That is, the ability to transform any distress into eustress. We can even talk about the learning through stress, that is, to be ready for changes, to be able to use effective coping strategies, resist or be insensitive to stress factors (Cabib et all., 2020). Considering the above in the context of facing such unexpected and strong challenges as COVID-19 lockdown, the previous experience, prior preparation and the availability of skills that can be used are important.

Neuroplasticity should be taken into account while forming coping strategies against stress, because it also depends on the thoughts (Widdett, 2014; Pascual-Leone et all., 2005). Moreover, it has been found that a conscious attempt to evoke positive thoughts can directly provoke positive neuroplasticity (Newberg, 2010). Mindfulness is a key point in the creation of new contacts between neurons. There is evidence that brain structures can thus be structurally changed in the direction of increasing stress resilience. These data are based on studies of people who regularly use mindfulness and meditation practices. For instance, Buddhist monks, who are constantly engaged in deep spiritual practices including meditation and prayer have frontal

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lobes, which responsible for attention, more developed and differ from the brain of ordinary people. They also showed significantly less activation of the amygdala in response to stressors (Newberg, 2010). Not for nothing, in our survey meditations and prayers helped 40,4% of responders.

In addition to meditation, it can be recommended to engage in already familiar activities that give pleasure. This includes types of creative activity, hobbies, especially those associated with fine motor activity of the fingers. In the context of stress diminishing, unloading the prefrontal cortex is important. The brain obeys the principle of dominance and the excitation of some structures can be decreased when other structures become active. The basal ganglia and cerebellum are responsible for fine motor skills, especially programmed complex finger movements (for example, embroidery, knitting, drawing). The activation of these structures, especially when we are actively consciously involved in a certain work, makes their neurons more active compared to the cortical ones. The basal ganglia take over the dominant excitation, unloading the cortex, reduce it excitement and stressful tension generated by thoughts. This is the healing effect of distraction with the help of fine motor activity from the negative stress-inducing thoughts.

The task of psychological aid is to prevent the use of negative coping strategies and to stimulate and teach positive coping strategies. Positive coping strategies include physical activity, breathing exercises, relaxation, meditations, and creativity. Examples of negative ones are alcohol abuse, drugs, avoidance of social and physical activity, conflict and aggressive behavior, etc. Negative coping strategies only exacerbate the effects of stress, because they are a sign of failure of successful coping, but rather demonstrate an attempt to find a way out in any way (Widdett, 2014). Distress inhibits neuroplasticity and development of positive coping strategies. Negative coping strategies also inhibit neuroplasticity and counteract the formation of positive coping strategies.

Talking about initiation of positive coping strategies, one should push the patient towards them. A sick people, in whatever mental negative state may be, need positive emotions and support, because every positive thing can be critical in the initiation of the mobilization of own force. Although the emotional sphere is tense, it looks for a way out in order to regain usual state of comfort. If a person is in the hospital and his/her condition is serious, the medical staff should play a key role. A smile of the healthcare professional, the use of body language such as V gesture or an encouraging upbeat voice, direct thoughts towards positive (Yang et all., 2020). The same can be applied to relatives and friends. Incitation of positive emotions is an important factor in preventing the deepening of distress, in particular, under circumstances such as quarantine or other social upheavals. For instance, the use of emojis is very popular on social networks and may well be effective while communicating during the quarantine. Emotions, associated with communication, are important signals for human as a social being, they affect the functioning of such structures as the prefrontal cortex, limbic system, and amygdala, providing mental health. With social restrictions or other limitations associated with a lack of emotions, morphological changes were observed in these structures (Bzdok & Dunbar, 2020). It was noted that in people, who were active users of social networks during quarantine or isolation, symptoms of distress were less pronounced (Buodo et all., 2023). Here is meant, that only active use of social media like posting comments and sharing information made it possible to neutralize the effect of isolation while passive use such as scrolling and monitoring others belong to the negative copings. In this context, stimulation for the use of positive coping strategies is also important because in such way the use of negative ones will be prevented. After all, to reduce the level of distress, people can use different ways and data about the use of negative coping during the pandemic is also present. Neurotic or immature defenses were raised during quarantine (Gori, Topino, & Caretti, 2022), for instance, increased alcohol consumption (Grossman, Benjamin-Neelon, & Sonnenschein, 2020). Avoidant copings were associated with increased depression and anxiety while positive coping behaviors supported psychosocial well-being during the COVID-19 pandemic (Minahan et all., 2021).

A negative correlation was observed between individual resilience, well-being and distress caused by COVID -19. People with mental disabilities demonstrated lowest level of mental resilience (Kimhi et all., 2020; Kimhi et all., 2020; Stoyanova, Miteva, & Ivantchev, 2022). There is evidence that during the COVID-19 pandemic, higher level

of mental health literacy was associated with lower level of anxiety (Hu, Ye, & Tan, 2021) and it may well be considered as a protective factor. Concept of mental health literacy includes improved knowledge about mental health and mental disorders as well as understanding how to seek help and treatment.

The use of negative coping strategies depends on the mental state of each as well as on the level of education, upbringing and stress resilience at all, but not only during quarantine. This once again emphasizes the importance of proper upbringing of children and providing them with emotional support in childhood, instilling skills in overcoming difficult situations, and developing emotional intelligence. We should not wait for the next challenges that may arise, such as pandemics or natural disasters, and every society should have effective programs to provide the population with an appropriate level of mental health literacy, which should be implemented from the earliest stages of life. Effectiveness in protecting somatic health will not be achieved by neglecting mental health.

Our study has several limitations. The number of participants is small. Then, most of the participants are women. This tendency traditionally observed among surveys but raises the questions about the impact and character of mental disorders in men. We took into account the severity of disorders based on the respondents' subjective assessment of their own state, and not on objective data. Therefore, it is impossible to assess to what extent the self-assessment coincides with the real somatic and mental state. There is no control group in our study to establish the severity of mental symptoms among people who did not have COVID-19 during the first waves of pandemic. We do not know the objective degree of somatic affection but it may have a significant impact on the self-assessment and the severity of mental problems. In addition, the vast majority of our respondents suffered a mild or moderate form of the disease. Therefore, the question of to such degree the mental sphere was affected and the ways of its restoration in seriously ill people remains undisclosed.

CONCLUSIONS

The first waves of COVID-19 disease should be considered as having a distress component in its pathogenesis, which was provoked not so much by the disease as by social tension in societies and introduced quarantine measures. The time that has elapsed since the moment of recovery, that is, six months or more, turned out to be insufficient to ensure a complete somatic and mental recovery. The majority of our respondents (approximately 70%) noted that they did not fully recover both somatically and mentally after suffering COVID-19 and still need the future recovery. A significant part of the symptoms involves the mental sphere what indicate a high level of distress caused by isolation due to the pandemic. As well as, factors that helped to recover, mainly related to ways of coping with distress but do not directly affect the virus. Obviously, that such powerful social challenges require the wide involvement of psychologists in order to reduce social tension. In the development of methods to counteract distress, the pathogenetic mechanisms of its symptoms should be taken into account what will allow quickly and effectively restore mental health and well-being.

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ДИСТРЕС ЯК КОМПОНЕНТ ПАТОГЕНЕЗУ COVID-19 ВПРОДОВЖ ПЕРШИХ ХВИЛЬ ПАНДЕМІЇ

АНОТАЦІЯ

Визначення ступеня потреби у психологічній допомозі для повного одужання після COVID-19, а саме подолання негативних емоційних наслідків, тривожних розладів, що можуть підвищувати ризик розвитку страхів, панічних станів тощо є актуальним серед психологічних досліджень. Метою нашого дослідження було дослідити самооцінку емоційного та соматичного станів людей, які перехворіли на COVID-19. У дослідженні прийняли участь 104 респонденти, 81,7% з яких – жінки.

Перед захворюванням власний емоційний стан оцінювали як «хороший» або «дуже хороший» 71,1% респондентів: 44,2% та 26,9%, відповідно. Під час розпалу хвороби цей відсоток суттєво знизився та становив 14,3 %. На момент дослідження показники самооцінки власного емоційного стану зростають, однак не досягають рівня, який спостерігався перед хворобою: 54,7% опитаних оцінили свій стан як «хороший» (26,9%) та «дуже хороший» (27,8%). У той же час, під час розпалу хвороби 59,6 % опитаних оцінювали свій емоційний стан як «дуже поганий», «поганий» чи «скоріше поганий, ніж хороший», з них – 19,2 % оцінили свій стан як «дуже поганий», 18,2% - «поганий» та 22,1% - «скоріше поганий, ніж хороший». Серед емоційних порушень, які спостерігались під час хвороби переважали тривожність (62,5%), депресія (51%), страхи (майбутнього, смерті, інфікувати інших) (47,1%), апатія (45,2%), перепади настрою (34,6%), втрата сили волі (33,6%). На момент дослідження домінуючими залишились перепади настрою (30,7%), депресія (29,8%), тривожність (28,8%), апатія (19,2%), раптові неприємні спогади (19,2%) та втрата сили волі

(18,2%).

Серед соматичних порушень, які були наявні у наших учасників впродовж хвороби переважали підвищена втомлюваність (87,5%), фізична слабкість (86,5%), втрата/зміни нюху та/чи смаку (74%), порушення сну (61,5%), погіршення пам'яті, уваги, мислення (60,5%), втрата апетиту (58,6%). На момент опитування вираженими все ще залишались підвищена втомлюваність (50%), фізична слабкість (33,6%), погіршення пам'яті, уваги, мислення (31,7%) та порушення сну (26,9%).

Серед факторів, які допомогли нашим респондентам відновитися після хвороби, перше місце належить «зменшенню навантаження та відпочинок» (66,3%), «емоційна підтримка сім'ї та друзів» (64,4%), а також отримання правильної інформації про хворобу, яка давала можливість зрозуміти що відбувається та впевненість щодо обраних шляхів її подолання (50%).

Значній частині респондентів допомогли самостійна робота з думками та емоціями (медитації, молитва) (40,4%) та досвід одужання інших людей (40,4%). Певній частині (26%) в нагоді стала робота з психологом та психотерапевтом для подолання наслідків COVID-19. Фізичні та дихальні вправи були корисними для 44,2% наших респондентів. Несподівано, способи відновлення соматичного здоров'я, такі як вживання медикаментів, зайняли останнє місце (18,3%).

Результати наших досліджень дозволяють припустити, що перебіг захворювання COVID-19, під час перших хвиль, характеризувався сильним впливом дистресу, зумовленого високим рівнем соціальної напруги, який сильно впливав на психічну сферу, зумовлюючи тривогу та занепокоєність. Відповідно, зменшення рівня дистресу шляхом підтримки друзів та сім'ї, отриманні правильної інформації про хворобу, тощо, відіграли більшу роль, ніж медикаменти.

Ключові слова: дистрес, COVID-19, психологічний стан, соматичний стан, відновлення

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