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The COVID-19 pandemic: new challenges for the mental health protection system

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Abstract

Purpose: The comparative investigation of the scientific research materials and systematization of the latest data on the epidemiological state, pathogenetic mechanisms, clinical manifestations, risk factors, and psychopathological consequences of the impact of the COVID-19 pandemic on the mental health of the population is needed for the further targeted development of treatment and rehabilitation measures.

Views: The COVID-19 pandemic has been increasingly viewed through the lens of serious global mental health issues. This article analyzes the results of original research and publications data on the etiopathogenesis, neuropsychiatric features, and risk factors of mental disorders associated with the pandemic. The study was carried out within the scope of the scientific research work of the Department of General, Children's Forensic Psychiatry, and Narcology of the Shupyk National Healthcare University of Ukraine. Its title was "Development of a multimodal system of restorative therapy and medical and psychological rehabilitation of patients with COVID-19, based on the study of leading pathogenetic mechanisms" (state registration number 0121U114707).

Conclusions: Despite the recent rapid increase in the number of sources in the literature devoted to the consequences of the COVID-19 pandemic, several questions remain unresolved. This especially applies to disorders in the mental sphere, concerning clinical phenomenology, features of emotional and cognitive disturbances, personal response, levels of social functioning and the quality of life of patients who have suffered from COVID-19. The data obtained can serve as the basis for the further development of a multimodal model of hierarchical structural-functional pathogenetic links of mental disorders, as well as a target-oriented system of restorative therapy and medical-psychological rehabilitation of patients who have suffered from COVID-19.

Key words: COVID-19, pandemic, mental disorders, psychopathology, pathogenesis, therapy, rehabilitation.

INTRODUCTION

The increase in the number of extreme situations, including Russia's invasion of Ukraine and the COVID-19 pandemic, dictates the need for medical treatment measures and the medical-psychological rehabilitation of persons who have suffered because of the negative impact of emotional stressors.

A significant proportion of the population of Ukraine has a mental disorder. This determines the need for the operative assessment of patients' condition, prognosis of the detected disorders, and implementation of possible treatment and medical rehabilitation measures.

In 2005, Ukraine signed the European Declaration on Mental Health Protection and the European Action Plan on Mental Health Protection at the WHO European Conference "Mental Health Protection, Problems and Solutions", which was held at the level of Ministers of Health in Helsinki, Finland.

Subsequently, the Concept of Development of Mental Health Care in Ukraine for the period until 2030 was developed, and approved by the Decree of the CMU dated 27 December 2017 No. 1018-r, and the Plan of Measures for its Implementation, approved by the Decree of the Cabinet of Ministers of Ukraine dated 06.10.2021 No. 1015.

According to these documents, priority tasks are the development and implementation of comprehensive, integrated, and effective mental health care systems that include elements such as health promotion, preven-

tion, psychoeducation, treatment and rehabilitation, and health care and health restoration.

PURPOSE OF THE STUDY

The purpose of this study was to compare the latest data on the pathogenetic mechanisms, risk factors, and psychopathological consequences of the impact of the COVID-19 pandemic on the mental health of the population, on the basis of the scientific literature. The study was carried out within the scope of the scientific research work of the Department of General, Children's Forensic Psychiatry, and Narcology of the Shupyk National Healthcare University of Ukraine. Its title was "Development of a multimodal system of restorative therapy and medical and psychological rehabilitation of patients with COVID-19, based on the study of leading pathogenetic mechanisms" (state registration number 0121U114707).

The electronic resource PubMed of the US National Center for Biotechnology Information (NCBI), the Internet data analysis system MEDLINE of the US National Library of Medicine (NLM), the National Scientific Medical Library of Ukraine (NSLMU), the Vernadsky National Library of Ukraine (NLU) and the sources in the databases Scopus and Web of Science were used for the analysis. This article considered scientific papers published in 2019-2021, as well as some papers published earlier if the research results presented in them were relevant to the problem under consideration. Particular attention was paid to methodologically sound studies and meta-analyses, due to the high level of presented evidence and their informative value, but papers clarifying and supplementing the data from the meta-analyses were also reviewed. Articles were selected based on the following keywords: COVID-19 pandemic, mental disorders, psychopathology, pathogenesis, therapy, rehabilitation. As a result, 253 published papers were reviewed, of which 89 articles were used in this analysis.

VIEWS

General information about mental disorders resulting from the COVID-19 pandemic

The COVID-19 pandemic is increasingly viewed through the prism of serious global mental health issues [1]. Initially, all the resources of society were directed to overcoming the systemic medical – including organizational – consequences of the coronavirus infection. Later, the focus shifted to mental issues due to the association of COVID-19 with mental and neurological disorders [2, 3]. In this regard, 89% of the world's countries have already reported their initiation of mental health and psychosocial support solutions in their national COVID-19 control plans [4]. In addition, the application of strategies for the containment of COVID-19 have had a significant social and economic impact on all aspects of people's lives. An additional, significant psycho-traumatic stressor has been the so-called atypical manifestation of overcoming the pandemic, intensifying the existing emergency of the public health care system [5-7].

The mental epidemic associated with COVID-19 has been confirmed by scientific research [8]. Although its impact on broad segments of global society has been defined as reversible, there remain large contingents of people who will have long-term mental consequences stemming from COVID-19 and the need to restore levels of social functioning and quality of life. Such vulnerable categories include medical workers, children and adolescents, the elderly, patients with mental disorders, and patients who have suffered from COVID-19 [9, 10]. The proportion of the latter is 80.6% of the total number of patients with coronavirus infection worldwide, and 81.4% in Ukraine [11].

Neuropsychiatric consequences of the COVID-19 pandemic

Most studies on the neuropsychiatric consequences of COVID-19 are limited to their manifestations at the pre-hospital and hospital stages. The impact of SARS-CoV-2 on the CNS and mental health of patients remains unclear [12]. The direct effect of the virus (encephalitis), neuroinflammation (cytokine storm in the brain tissue), multiple organ dysfunction, and cerebrovascular changes are potential casual mechanisms for the emergence of neurological and psychiatric symptoms [13-17]. Individual cases of viral encephalitis, hypoxic encephalopathy [18], meningitis-encephalitis [19], infectious-toxic encephalopathy, acute cerebrovascular diseases [20], primary psychotic episode [21, 22], and disorders of consciousness [23-26] have been described. Several studies devoted to the prevalence of psychoneurological symptoms [27-30].

The structural and biological similarity of SARS-CoV-2 with other CoVs [31] contributed at the beginning of the pandemic to assumptions about similar effects to MERS and SARS on the human psyche. Previous studies have confirmed that the new coronavirus pandemic has seriously affected the mental health of many of those infected. Two meta-analyses (12 and 38 studies, 20,404 individuals) indicated depression (35%), anxiety symptoms (28%) [31, 32], and post-traumatic stress disorder (PTSD) (18%) in patients with COVID-19 [33].

Scientific research on the effects of COVID-19 is still in the early stages of development. There is still a scientific discussion ongoing about terminological definitions ("Post-COVID," "Long-COVID," "Persistent Post-COVID", "Post-Acute COVID") [34-37]. There are also contradictions in the qualification and classification of post-covid syndromes

due to a wide range of clinical presentations (respiratory, neurological, gastrointestinal, dermatological, etc.), which are difficult to differentiate from other diseases. The same applies to neuropsychiatric symptoms in the form of anxiety, depression, PTSD, sleep disorders, and suicidal behavior, the potential causes of which can be both direct SARS-CoV-2 and psychosocial stress caused by the COVID-19 pandemic [2, 34, 38-40].

The analysis of nososyndromic entities showed that two categories of mental disorders were observed: neurotic and psychotic. At the neurotic level, acute stress reaction, adjunctive disorder and anxiety-phobic disorders were observed, while the psychotic level included delirium with exacerbations, delirium of various types and mild cognitive disorders. To a lesser extent, hallucinatory-paranoid disorders were also observed.

Factors and category of increased risk

During the pandemic and its related restrictions, the world experienced a deep economic crisis that affected all segments of the population with varying degrees of force. The COVID-19 pandemic suddenly burst the everyday lives of people in virtually all countries, breaking life stereotypes formed over many decades [53-57]. To date, it has been established that COVID-19 has a negative impact on the mental health of the population worldwide [41-44, 50]. Negative emotional and stressful factors include fears of coronavirus infection, fear of a possible risk of infection, the unpredictable course of the disease, the lack of unambiguously stable treatment methods, and general uncertainty in society. This causes negative psychological reactions such as distress and maladaptation [51, 52, 58, 59]. According to the results of a study conducted in China, which included 1,200 participants, 54% of them rated the impact of COVID-19 as moderate or severe, 29% reported moderate-to-severe anxiety, 17% reported moderate-to-severe depressive symptoms, and more than 75% were worried that their relatives might be infected [42, 60, 61]. Another survey involving 53,000 respondents showed that 35% of participants experienced psychological stress: 29% from mild to moderate, and 5% severe [62, 63]. The measures taken in connection with the pandemic (quarantine, distance learning in schools and higher education institutions, remote work, closure of secondary enterprises, and limited movement) have a negative impact on people's ordinary lives. It is believed that these measures can be predictors of the development of psychological and mental symptoms [45-49, 57, 64, 65].

Health care systems globally, and in particular psychiatric services, were used to addressing other problems, having been formed at a different time and for other purposes, and so they proved to be unprepared for the large number of patients with coronavirus infection who required medical care. During the pandemic, specific

mental disorders appeared, and the peculiarities of their pathogenesis, pathophysiology, and clinical dynamics require studying. It should be emphasized that in the case of a severe form of coronavirus disease, the stigmatization of society limits the availability of highly qualified medical care for patients with mental disorders [27, 51, 66, 67].

Analysis of various influencing factors and randomized reference population groups showed that certain categories of the population were most prone to mental disorders. These include medical workers, elderly people, teenagers, and people with previously diagnosed mental disorders [55, 69]. Medical workers who were on the front line, in close contact with infected patients, were also subjected to excessive workloads, therefore, physical exhaustion, fear, emotional disorders, and sleep disorders were more often registered among them [59, 60, 70]. The reasons for this situation were inadequate personal care, intra-hospital transmission of infection, and ethically difficult decisions regarding medical triage when the medical system could not withstand the load [71, 72]. According to the data in one study [67], the prevalence of anxiety among medical workers was 23.21%. The study used the Tsun Self-Assessment Anxiety Scale (SAS), the Generalized Anxiety Disorder (GAD) questionnaire, and other measures. The prevalence of depression in this category of the population was 22.8% (according to the Tsun Self-Assessment Depression Scale [SDS] and Patient Health Assessment [PHQ-9], etc.). The overall prevalence of sleep disorders was 32%.

In contemporary scientific literature, data on the group analysis of the prevalence of anxiety and depression by sex, degree of severity, and professional group are defined and presented in sufficient detail. Various studies [61, 63, 71, 73] have found higher indicators of affective symptoms in female than in male doctors and medical personnel more generally. It should be emphasized that mild symptoms of both depression and anxiety were found in the majority of medical professionals, while moderate and severe symptoms were less common among the participants in our study. The prevalence of anxiety and depression was higher among paramedics than among doctors. These data may be distorted because most of the medical staff are women, but also by the fact that they spend more time in the wards, have more contact with patients, and are responsible for taking biological material for the detection of the virus. Also, on average, medical personnel were in closer contact with patients compared to doctors and were more exposed to psychological injuries associated with the death of patients and their physical suffering [61, 63, 71, 73]. The analysis of the behavioral reactions of medical personnel has mainly focused on non-specific astheno-neurotic and similar burnout syndrome states.

According to the literature [66], patients with mental disorders had several specific areas of vulnerability during the pandemic. They were much more likely to suf-

fer from a concomitant pathology, which was a risk factor for the severe course of coronavirus disease. Indeed, according to the data of international researchers and our observations, there were some pre-dispositional factors that increased the likelihood of developing mental disorders. The most important of them, in our point of view were the intercurrent chronic somatic diseases, organic brain compromise, chemical addiction, and aging reference groups.

Elderly patients were more susceptible to the effects of coronavirus infection. Mortality from COVID-19 increased with age, and in people older than 80 years it was 14.8%. Elderly people are more likely to experience loneliness, which can increase during a pandemic, and in patients with mental disorders it can lead to the exacerbation of pathology [55, 56, 67, 74].

Prevalence of mental disorders due to the COVID-19 pandemic in adults

A study of 7,348 patients with a positive test result for coronavirus (SARS-CoV-2) was conducted to evaluate the relationship between mental disorders and mortality among adults with COVID-19, of whom 75 (1%) had a history of schizophrenia spectrum disorder, 564 (7.7%) had affective pathology, and 360 (4.4%) had anxiety disorder. Moreover, because of a retrospective analysis, it was established that the risk of death in patients with a diagnosis of the schizophrenic spectrum is 2.7 times higher than that in the general population, and that the risk of death in patients with affective pathology and anxiety disorders was statistically insignificant. At the same time, schizophrenic spectrum disorders ranked second as a risk factor for death, after age, based on the strength of the relationship of all demographic and medical risk factors reviewed in this study [49, 67].

According to a recent meta-analysis, the overall prevalence of PTSD and psychological distress in the general population during the pandemic was 23.88% and 24.84%, respectively. These data indicate that the prevalence of PTSD and psychological stress is increasing among the population [75, 79]. According to a systematic review and meta-analysis that included 62 studies with 162,639 participants from 17 countries worldwide, the overall prevalence of anxiety was 33%, with considerable heterogeneity. Various psychometric methods were used in the studies: the Beck Anxiety Scale (BAI), Depression, Anxiety and Stress Scale (DASS-21), the Generalized Anxiety Disorder Questionnaire (GAD-2/GAD-7), the Hamilton Anxiety Assessment Scale (HAM-A), the Hospital Anxiety and Depression Scale (HADS), the Patient Health Rating Scale (PHQ-4/PHQ-9) and the Tsun Self-Rated Anxiety Scale. The prevalence of anxiety was higher among patients (56%) than among medical professionals (26%) or the general population (32%). Among the medical

workers, the prevalence of anxiety ranged from 7% in Singapore to 57% in Italy. It was established that the highest prevalence of anxiety among the population was observed in Italy – 81% [43, 58].

Among patients with COVID-19 and comorbidities, the prevalence of anxiety was consistently high, ranging from 40% in patients with type 2 diabetes in India to 82% in those with Parkinson's disease in Iran. The prevalence of anxiety was 47% in patients with COVID-19, 50% in cancer patients, and 58% in caregivers of patients with Parkinson's disease. Studies have shown that the prevalence of moderate-to-severe anxiety among patients with psychiatric disorders is 24% [66, 52]. In addition, because of a meta-analysis of studies in which psychometric scales were used, the prevalence of depression was found to be 28%. At the same time, the prevalence of depression was higher among patients (55%) than among medical workers (26%) or the general population (27%). Among healthcare workers, the prevalence of depression ranges from 9% in Singapore to 51% in China. The highest prevalence of depression was observed in Italy (67%). Patients with psychiatric disorders reported a prevalence of moderate to severe depression in 22% of cases [62, 67, 80].

It was crucial to compare the data from Southeast Asian countries, where the spread of COVID began, with the countries of Europe and the USA. The comparison of the clinical phenomenology of mental disorders revealed that in Ukraine there was a predominance of triadic, anxiety-depressive, and anxiety-phobic symptoms, including paroxysmal manifestations, with corresponding vegetative support in the syndromic structure.

Meta-analyses also provide data on the prevalence of distress, stress, and sleep disorders, which are 35%, 40%, and 32%, respectively. The prevalence of PTSD was highest among patients with COVID-19 (93%), healthcare workers, and the general population (3%) [49, 69, 80, 81].

In addition, in five studies the general prevalence of mental disorders ranged from 14% to 72% in medical workers and from 40% to 54% in the general population. At the same time, the prevalence of mental symptoms was higher among patients with already-existing pathological conditions and among patients with recently laboratory-confirmed COVID-19 [67, 68, 82, 83].

Peculiarities of mental disorders due to the COVID-19 pandemic in children

It is noted in the literature that the impact of the COVID-19 pandemic on children and adolescents will have more long-term global negative consequences, owing to the greater impact on their social and emotional development than on the adult population [55, 74, 84]. It should be emphasized that children, adolescents with mental disorders, and their families belonged to vulnerable groups during the pandemic. In children and ado-

lescents, there was, during the quarantine period, a decrease in physical activity, excessive use of the Internet and social networks, and access to harmful content due to a long stay at home, violations of the work and rest regime, and violations of the nutrition regime. At the same time, social services did not work at full capacity during the quarantine period, and children who live in dysfunctional families rarely report abuse or violence [44].

According to the literature, adolescents with mental disorders do not tolerate isolation well, and are also prone to the interruption of drug therapy. The prevalence of obsessive-compulsive disorder (OCD) in children and adolescents is estimated at 0.25-4%. Children with OCD are thought to have been greatly affected by the pandemic because the main theme of their obsessive thoughts and actions is often related to cleanliness, frequent hand washing, fear of contamination, and cleanliness is the main measure of protection against the spread of the infection of COVID-19 [73, 80]. The prevalence of PTSD in quarantined children is reported to be 30%.

The danger of sudden death due to COVID-19 is a risk factor for PTSD and also of long-term depressive response. There are also data in the literature that the prevalence of depressive symptoms in adolescents is 43%, 37% of adolescents experience anxiety and 31% are affected by anxiety and depressive symptoms. At the same time, the highest risk factor for the development of these symptoms is female gender [58, 68].

Use of psychoactive substances, non-chemical addictions and other behavioral deviations

An important aspect of the problem was prolonged isolation during the coronavirus pandemic, which provoked children, adolescents, and adults to use alcohol, psychoactive substances (surfactants) and sedatives. The consumption of alcohol and surfactants accounts for approximately 1.5% of the total burden of disease, and in some countries, this percentage can reach 5%.

Currently, sporadic evidence of increased alcohol consumption during the pandemic has emerged in scientific publications, but in Ukraine it is extremely difficult to determine this trend because of regional restrictions and bans on alcohol sales during the ongoing war with the Russian aggressor and the virtually uncontrolled use of home-grown alcohol sold on the black market.

In addition to alcohol addiction and addiction to surfactants, addictive behavior associated with the "infodemic" and Internet addiction appeared during the pandemic. Excessive engagement in video games disrupts circadian rhythms and leads to persistent sleep disturbance and general asthenia of the body, which can be a predictor of coronavirus infection. Therefore, social isolation, stress, anxiety, worry, excessive leisure time playing video games, and social networks lead to an increase in

non-chemical addiction, which also causes emotional lability, irritability, aggression, and anxiety [46, 47, 50, 61].

Modern infectious pandemics are accompanied by noninfectious mental epidemics. Thus, during the H1N1 influenza pandemic in 2009, a simultaneous emotional pandemic was recorded and, for the first time, the concept of "emotional epidemiology" was introduced into the scientific lexicon [60]. During pandemics, fear and anxiety are an integral part of the human mental state [43, 51, 56, 73]. The direct and indirect effects of the coronavirus disease (COVID-19) pandemic on the psychological well-being and mental health of the population are yet to be studied, but we can already analyze its short-term effects today.

The Director General of the World Health Organization (WHO) Tedros Adhanom Ghebreyesus officially confirmed the existence of the "infodemic" and called for fighting against it, since having covered the whole world it significantly complicated the fight against the real problem of overcoming the COVID-19 pandemic [42, 84]. In fact, the COVID-19 pandemic is the first pandemic in the world history that unfolded in the presence of Facebook and other social networks, and was therefore accompanied by unprecedented panic, the consequences of which significantly worsened the consequences of COVID-19. Excessive fixation (more than three hours per day) on information and problems related to the COVID-19 pandemic was a leading factor in the development of PTSD, anxiety-phobic, depressive disorders, and insomnia [54, 73, 81]. Chinese researchers have evaluated the relationship between mental health problems and exposure to social media during the COVID-19 pandemic. An online survey of 4,872 people over the age of 18, from 31 provinces and autonomous regions, was used to conduct mental health assessment. The prevalence of depression, anxiety, and a combination of both was 48.3%. More than 80% of participants reported that they were often influenced by social media. Researchers therefore propose to fight the "infodemic" during emergency situations [27, 80]. In addition, quarantine and social isolation were some of the factors that led to psychiatric disorders associated with the COVID-19 pandemic. Most people had never encountered these problems in their lives since the new era of control of the spread of infectious diseases began only in 2002-2003 during the outbreak of the SARS coronavirus (severe acute respiratory syndrome, "atypical pneumonia") [68]. The related problems of unorganized free time, sensory deprivation and space limitation, reduced motor activity and constant interaction within a limited circle of people caused an increase in family violence, and in the number of divorces as well as the number of people addicted to alcohol and psychoactive substances [59, 65, 73, 80, 86].

During pandemics, the number of crimes, aggressive and self-aggressive forms of behavior, addiction to

alcohol, and drugs increase. An increase in domestic violence was noted during the COVID-19 pandemic. Since a quarantine was announced in France in March 2020, the number of recorded acts of domestic violence during the lockdown increased by 30% while in quarantined areas of China, the number of divorces increased by 30% [52, 64, 71, 76, 77]. The risk of death by suicide increased by 42% in people with a history of hospitalization for infectious diseases [73, 80]. A scientific analysis of suicide mortality in the case of COVID-19 has not yet been conducted but reports of suicides among patients and medical workers have already appeared on the Internet [42].

During the pandemic, all hospital residents experienced episodes of non-pathological or pathological anxiety. In a study conducted in the wards of the Zhejiang University Medical School Hospital for patients with COVID-19, it was found that 48% of patients experienced psychological stress (pathological anxiety) upon admission [42, 45, 58, 67, 88]. Patients with COVID-19 also experienced organic anxiety, especially at a late stage of disease development, when their lungs were affected (the main cause of both the severity of the condition and its fatal consequences), as was the cardiovascular system, the kidneys, and the central nervous system (78-88% of patients with severe forms of COVID-19) [53, 69, 70, 87, 89].

CONCLUSIONS

Based on the material presented, it seems possible to conclude that, until now, no comprehensive studies have been conducted dedicated to the evolution of the mental consequences of the COVID-19 pandemic. Questions remain unresolved regarding the clinical phenomenology of mental disorders, the characteristics of the emotional and cognitive spheres, personality responses, levels of social functioning, and quality of life in COVID-19 survivors. There is a need to create a model of hierarchical, structural-functional pathogenetic links of mental disorders, as

well as a target-oriented system of restorative therapy and medical-psychological rehabilitation for patients who have suffered from COVID-19. To some extent, both adequate and inadequate measures have been taken in the health care systems globally, but this can only be assessed retrospectively based on longitudinal observation data.

Nevertheless, new theoretical scientific data can provide the basis for further development of a multimodal model of hierarchical structural-functional pathogenetic links of disturbances to the mental sphere, as well as a target-oriented system of restorative therapy and medical-psychological rehabilitation of patients who have suffered from COVID-19. This is particularly important for numerous populations with predisposing, compromising factors, particularly people who have been exposed to war stress and combat trauma, forced migrants, children, the elderly, and other groups.

The introduction of such a system will minimize the impact of the COVID-19 pandemic and significantly improve the social functioning and quality of life of numerous segments of the population.

Our work was carried out in the summer and autumn of 2022, when there were no publications in the scientific literature on the relationship between the impact on the psyche of the population undergoing COVID-19, while the ruthless and criminal military invasion of Ukrainian territories by Russian troops took place. A promising direction is the creation of a system of targeted medical, psychological, psychotherapeutic, and psychiatric care for war-stress patients, combatants, refugees and internally displaced persons, whose medical history has been aggravated by COVID-19, and others those who were not taken ill during the 2029-2022 pandemic. Such studies are currently underway, also by the authors of this paper, which suggests that we plan to expand this review with new data in future publications.

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