

Original article

Assessment of mental health disorders in individuals with chronic diseases during the COVID-19 pandemic

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Summary

Introduction. The COVID-19 pandemic has had a significant impact on the mental health of individuals with chronic diseases. Contributing factors include limited access to healthcare during lockdowns, fear of infection, and heightened stress due to poorer outcomes of COVID-19 infection in this population. The aim of this study was to examine the presence of depression, anxiety, and stress in the second year of the COVID-19 pandemic among individuals with pre-existing cardiovascular, malignant, chronic respiratory diseases, or diabetes mellitus.

Methods. A cross-sectional study was conducted among the general population of the eastern region of Republic of Srpska during December 2021 and January 2022. Depression, anxiety, and stress were assessed using the DASS-21 scale, while data on comorbidities were collected through a questionnaire from an epidemiological population-genetic study conducted concurrently.

Results. A total of 1,372 participants from the eastern region of Republic of Srpska were included in the study, consisting of 40.0% males and 60.0% females. Participants were aged 20 years and older, with an average age of 50.6 years. The study found that depression, anxiety, and stress were statistically significantly more prevalent among participants with pre-existing cardiovascular or chronic respiratory diseases compared to those without such conditions. Additionally, participants with a history of malignant diseases or diabetes mellitus were significantly more depressed and anxious than those without these conditions.

Conclusion. The findings of this study may contribute to the development of policies aimed at improving mental health and preventing mental disorders in individuals with comorbidities.

Key words: mental health, chronic diseases, COVID-19 pandemic

Introduction

The COVID-19 pandemic has had a profound impact on mental health and well-being worldwide [1]. In the first year of the pandemic, an estimated 53.2 million additional cases of major depressive disorder and 76.2 million new cases of anxiety were reported globally [2]. A review of research literature from China, India, Nepal, Iran, Iraq, Japan, Nigeria, the United Kingdom, Italy, and Spain [3] revealed that during the COVID-19 pandemic, the average prevalence of depression in these countries was 33.7%, anxiety 31.9%, and stress 29.6%. In an effort to quantify the pandemic impact on mental health, the scientific community has focused on investigating both the direct effects of COVID-19 infection and the indirect effects of infection control measures, such as quarantine, social distancing, self-isolation, and broader socioeconomic disruptions [4, 5].

A particularly vulnerable group during the pandemic, with a higher risk of developing depression, anxiety, and stress, was the group of patients with comorbidities and chronic conditions [6]. Numerous studies have shown that patients with chronic conditions significantly reduced their use of regular healthcare services during the pandemic due to fear of infection and its consequences [7]. Moreover, limited access to healthcare during lockdowns created a substantial mental burden, leading to psychological stress and anxiety disorders [8]. Patients with chronic conditions also experienced heightened stress due to the increased risk of poorer outcomes from COVID-19 infection [9].

According to data from the World Health Organization (WHO), cardiovascular diseases (CVD) are the most common among chronic non-communicable diseases in terms of annual mortality, followed by malignant diseases, chronic respiratory diseases, and diabetes mellitus [10]. The association between these diseases and mental health has been well-documented in the literature even

before the pandemic. Large prospective epidemiological studies, as well as smaller studies, have established a strong link between cardiovascular diseases and certain psychological conditions, including depression, anxiety, and post-traumatic stress disorder. Behavioral and biological mechanisms have been proposed as potential pathways for this connection [11]. Similarly, a diagnosis of a malignant disease can trigger symptoms of mental health disorders, such as sadness and worry, but some individuals may develop more severe mental health conditions, including anxiety, depression, and/or post-traumatic stress disorder [12]. It is estimated that more than one-third of patients with chronic obstructive pulmonary disease (COPD) experience depression and anxiety [13], while COPD exacerbations have also been linked to post-traumatic stress disorder. Patients with two or more exacerbations show double the prevalence of this psychological disorder [14]. Hypoxia, smoking, inflammation, symptom severity, and the quality of life in COPD patients are believed to contribute to depression, anxiety, and stress [15]. A significant prevalence of depression, anxiety, and stress is also observed among individuals with diabetes mellitus [16].

To the best of our knowledge, no studies had been published in Republic of Srpska regarding depression, anxiety, and stress in patients with chronic diseases during the COVID-19 pandemic at the time this study was conducted. Therefore, the aim of this study was to assess the levels of depression, anxiety, and stress in individuals with chronic diseases during the COVID-19 pandemic and to evaluate the differences in the severity of these disorders compared to the general population.

Methods

The study was designed as a cross-sectional study conducted simultaneously with a sero-

prevalence study of SARS-CoV-2 infection in the population of Republic of Srpska and an epidemiological population-genetic study on the prevalence of COVID-specific markers. The study population included individuals aged 20 years and older residing in the eastern part of Republic of Srpska. The research was carried out in primary healthcare centers during December 2021 and January 2022. Participation in the study was voluntary and anonymous.

The research instruments used were the seroprevalence study questionnaire (from which basic demographic data of the participants were collected), the population-genetic study questionnaire (from which data on analyzed comorbidities were obtained), and the DASS-21 scale (used to assess mental health). The DASS-21 scale (Depression Anxiety Stress Scales) is a shorter version of the DASS-42 scale and is a standardized tool for self-assessing unpleasant emotional states, specifically symptoms of depression, anxiety, and stress. It consists of a set of three subscales, each with seven items, designed to assess the states of depression, anxiety, and stress experienced in the previous week. The "Depression" subscale includes items evaluating the core symptoms of depression, such as low positive affect, dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest and involvement, anhedonia, and inertia. Somatic symptoms that are part of the criteria for a depressive episode according to DSM-IV, such as issues with sleep, appetite, and concentration, are excluded from this subscale as they are not specific to depression itself but also to anxiety disorders. The "Anxiety" subscale assesses symptoms of physiological arousal (dry mouth, difficulty breathing) and skeletal muscle effects (trembling), situational anxiety, as well as the subjective experience of anxious affect. The "Stress" subscale evaluates symptoms of general, non-specific arousal, such as relaxing difficulty, nervous excitement, easy disturbance and agitation, irritability, hypersen-

sitivity, and impatience [17, 18].

The participants rated how they had felt in the past week using a 4-point Likert scale, assessing the severity/frequency of depressive, anxiety, and stress symptoms they experienced, ranging from 0 ("not at all") to 3 ("mostly or almost always"). The scores for depression, anxiety, and stress were obtained by summing the scores of the relevant items, with a range of 0–21 for each subscale. The severity of symptoms was ranked using "cut-off" scores to define normal, mild, moderate, significant, and very significant scores for each subscale. For the depression subscale, a total score of 0–4 is considered normal; 5–6 indicates mild depression; 7–10 moderate depression; 11–13 severe depression; and ≥ 14 indicates very severe depression. For the anxiety subscale, a score of 0–3 is considered normal; 4–5 indicates mild anxiety; 6–7 moderate anxiety; 8–9 severe anxiety; and ≥ 10 very severe anxiety. For the stress subscale, a score of 0–7 is considered normal; 8–9 indicates mild stress; 10–12 moderate stress; 13–16 severe stress; and ≥ 17 very severe stress. Very severe symptomatology refers to the depression score of 14+, anxiety score of 10+, and stress score of 17+. These scores indicate the severity of symptoms, not the degree of a mental disorder [17, 18].

Statistical data analysis

For the statistical analysis in this study, both descriptive and analytical statistical methods were used. Descriptive statistics included measures of central tendency (median), while the Mann-Whitney U test, a non-parametric test, was used for assessing the significance of the differences in the obtained results. All variables used were previously tested for the normality of distribution using both computational and graphical methods (Kolmogorov-Smirnov test and histogram). The dependent variables in this study were depression,

anxiety, and stress, while the independent variable was comorbidity (cardiovascular disease, malignant disease, chronic respiratory disease, or diabetes mellitus). A p-value of <0.05 was considered statistically significant, while a p-value of <0.001 was considered highly statistically significant. Statistical analysis was performed using IBM SPSS Statistics 26 software.

Results

A total of 1372 participants from the eastern part of Republic of Srpska were included in the study. The sample consisted of 40.0% male participants and 60.0% female participants. The average age of the participants was 50.6 ± 14.7 years. Regarding the analyzed comorbidities, cardiovascular diseases were present in 11.8% of the participants, malig-

nant diseases in 2.9%, chronic respiratory diseases in 3.2%, and diabetes mellitus in 9.5% of the participants.

Cardiovascular diseases

In table 1, data on depression, anxiety, and stress are presented in relation to the presence of cardiovascular disease. The analysis of these data revealed statistically significant differences in the mean values of all three mental disorders among respondents who reported having cardiovascular disease compared to those who did not (depression: $p=0.001$; anxiety: $p \leq 0.001$; stress: $p=0.007$). The obtained median values indicate that respondents with a previously diagnosed cardiovascular disease have higher scores for depression, anxiety, and stress compared to those who reported not having cardiovascular disease.

Table 1. Depression, anxiety, and stress in relation to cardiovascular diseases

Subscale	CVD			Median	Mann-Whitney U test	Z	p
	presence	n	%				
Depression	yes	162	11.8	8.0	82534.500	-3.381	0.001
	no	1210	88.2	2.0			
Anxiety	yes	162	11.8	5.0	80673.500	-3.771	0.000
	no	1210	88.2	4.0			
Stress	yes	162	11.8	12.0	85319.000	-2.679	0.007
	no	1210	88.2	8.0			

Malignant Diseases

In the group with malignant diseases, statistically significant differences were observed for depression ($p=0.010$) and anxiety ($p=0.025$), while no significant difference was found for

stress. Respondents who reported having the malignant disease had significantly higher mean scores for depression and anxiety compared to those who did not have the malignant disease (Table 2).

Table 2. Depression, anxiety, and stress in relation to malignant diseases

Subscale	Malignant Diseases			Median	Mann-Whitney U test	Z	p
	presence	n	%				
Depression	yes	40	2.9	8.0	20475.500	-2.588	0.010
	no	1332	97.1	2.0			
Anxiety	yes	40	2.9	10.0	21256.000	-2.248	0.025
	no	1332	97.1	4.0			
Stress	yes	40	2.9	14.0	22365.000	-1.737	0.082
	no	1332	97.1	8.0			

Chronic Respiratory Diseases

In the case of chronic obstructive pulmonary disease (COPD), highly statistically significant differences were found for all three men-

tal disorders (depression: $p \leq 0.001$; anxiety: $p \leq 0.001$; stress: $p \leq 0.001$). Higher scores for depression, anxiety, and stress were observed in participants with COPD compared to those without this condition (Table 3).

Table 3. Depression, anxiety, and stress in relation to chronic obstructive pulmonary disease

Subscale	COPD			Median	Mann-Whitney U test	Z	p
	presence	n	%				
Depression	yes	44	3.2	8.0	21250.500	-3.195	0.001
	no	1328	96.8	4.0			
Anxiety	yes	44	3.2	14.0	20290.500	-3.563	0.000
	no	1328	96.8	4.0			
Stress	yes	44	3.2	16.0	20628.500	-3.346	0.001
	no	1328	96.8	8.0			

Diabetes Mellitus

Table 4 presents data on depression, anxiety, and stress in relation to the presence of diabetes mellitus. Based on these data, the statistically significant difference was observed for depression ($p=0.007$) and the highly

statistically significant difference for anxiety ($p \leq 0.001$). Participants with diabetes mellitus were significantly more depressed and anxious compared to participants without diabetes mellitus. Regarding stress, no statistically significant difference was found (Table 4).

Table 4. Depression, anxiety, and stress in relation to diabetes mellitus

Subscale	Diabetes Mellitus			Median	Mann-Whitney U test	Z	p
	presence	n	%				
Depression	yes	131	9.5	6.0	70053.000	-2.693	0.007
	no	1241	90.5	2.0			
Anxiety	yes	131	9.5	7.0	66549.500	-3.520	0.000
	no	1241	90.5	4.0			
Stress	yes	131	9.5	11.0	76225.000	-1.157	0.247
	no	1241	90.5	8.0			

Discussion

Our study demonstrated significantly higher mean values of mental disorders among participants with chronic illnesses compared to the rest of the examined population. Notably, participants with cardiovascular or chronic respiratory diseases had substantially higher mean scores for all three analyzed mental disorders (depression, anxiety, and stress). On the other hand, participants with malignant diseases or diabetes mellitus showed higher mean values for depression and anxiety, but not for stress.

Regarding the association between cardiovascular diseases and mental disorders during the COVID-19 pandemic, similar findings were reported in the study by Chinese authors. This cross-sectional study included a total of 435 participants and was conducted during the first year of the pandemic. The study revealed that patients with cardiovascular diseases might exhibit symptoms of depression and anxiety not only due to disease complications but also as a result of the pandemic impact. Independent risk factors for anxiety and depression included marital status and discontinuation of treatment during the pandemic, while monthly income and access to telemedicine during the pandemic were identified as risk factors for anxiety [19]. The study by Abu Sayeed et al. also demonstrated that individuals with car-

diovascular diseases were the most vulnerable to symptoms of anxiety and depression during the pandemic, while those with more than one chronic illness were the most susceptible to stress symptoms. This study further highlighted a significant prevalence of depression, anxiety, and stress among patients with asthma, which aligns with the findings of our research [20]. Similarly, a study by American authors, using data from the COVID National Survey on 10,760 adults in the United States, revealed a notable presence of depression and anxiety symptoms among participants with asthma or chronic obstructive pulmonary disease [21].

Regarding malignant diseases, the results of our study indicated the significantly higher prevalence of depression and anxiety among participants with the history of malignancy compared to other participants (including healthy individuals and those with other analyzed chronic illnesses), while no differences were observed in terms of stress levels. A possible explanation for the lack of differences in stress levels between oncology patients and other participants in our study might be related to the timing of the research. Specifically, it was conducted during a calmer phase of the pandemic, when restrictions had been lifted, vaccination was underway, and infection and mortality rates from COVID-19 were lower, consequently reducing stress-related risks. A systematic review by the group of

Iranian authors, which included 55 studies in its final analysis, revealed that COVID-19 had the significant impact on the mental health of cancer patients. The most common causes of psychological distress among oncology patients were fear of COVID-19 infection, fear of disease progression, disruption of oncology services during the pandemic, cancer stage, and immunocompromised status [22]. Similarly, a meta-analysis by Chinese authors, encompassing 40 studies and 27,590 cancer patients, showed that the primary risk factors for depression and anxiety in the studied population were head and neck tumors. Patients with higher levels of education were found to have the significantly greater risk of depression, while higher levels of post-traumatic stress disorder were observed among employed patients and women with cancer [23]. To reduce psychological distress among oncology patients, Canada implemented psychological support packages during the pandemic, delivered through text messages and cost-effective population-based interventions targeted at these patients [24].

In our study, participants with diabetes exhibited significantly higher levels of depression and anxiety compared to those without diabetes, while no differences were observed in terms of stress. The presumed reason for the lack of difference in stress levels could be attributed to the calmer phase of the pandemic during which the research was conducted, similar to the case with participants who had the history of malignancy. The systematic review and meta-analysis by the group of Spanish authors included 37

studies conducted during the first two years of the pandemic, encompassing a total of 13,932 participants with diabetes. Their analysis revealed the significant presence of depression, anxiety, and stress among individuals with diabetes. The study also demonstrated that psychiatric comorbidities in diabetic patients had negative impact on the treatment of their underlying condition, thereby increasing their vulnerability during emergencies [25].

This study has several limitations. First, cross-sectional studies cannot establish causal relationships. Second, data on the presence of chronic illnesses were obtained based on participants' self-reported statements. Third, information on chronic diseases pertained to groups of conditions rather than specific illnesses. Although this research has highlighted the significant prevalence of depression, anxiety, and stress among participants with comorbidities during the COVID-19 pandemic, future studies are needed to conduct more detailed analyses of depression, anxiety, and stress in individuals with specific chronic illnesses, as well as to examine the factors associated with these issues.

Conclusion

The results of this study can assist healthcare policymakers in formulating comprehensive interventions to improve the mental health of patients with chronic diseases, as well as in planning the necessary resources for the implementation of these interventions.

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Ethical approval. The Ethics Committee of the Faculty of Medicine Foča, University of East Sarajevo, Republic of Srpska, Bosnia and Herzegovina, approved the study (No: 01-2-8, 06 November 2020) and informed consent

was obtained from all individual respondents. The research was conducted according to the Declaration of Helsinki

Conflicts of interest. The authors declare no conflict of interest.

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Procjena poremećaja mentalnog zdravlja kod osoba sa hroničnim bolestima tokom pandemije COVID-19

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Uvod. Pandemija COVID-19 je značajno uticala na mentalno zdravlje osoba sa hroničnim oboljenjima. Tome je najviše doprinio ograničen pristup zdravstvenoj zaštiti tokom karantina, ali i strah od infekcije i veći stres zbog lošijih ishoda same infekcije COVID-19 kod ovih osoba. Cilj ove studije je bio da ispita prisustvo depresivnosti, anksioznosti i stresa u drugoj godini pandemije COVID-19 kod ispitanika koji su od ranije imali kardiovaskularnu, malignu, hroničnu respiratornu bolest ili dijabetes melitus.

Metod. Studija presjeka sprovedena je među opštom populacijom istočnog dijela Republike Srpske tokom decembra 2021. i januara 2022. godine. Za procjenu depresivnosti, anksioznosti i stresa korišćena je DASS-21 skala, dok su podaci o komorbiditetima dobijeni pomoću upitnika epidemiološke populaciono-genetičke studije koja je paralelno sprovedena.

Rezultati. U istraživanje su uključena ukupno 1372 ispitanika sa teritorije istočnog dijela Republike Srpske. Uzorak je činilo 40,0% ispitanika muškog pola i 60,0% ispitanika ženskog pola. Starosna dob ispitanika bila je 20 godina i više, a prosječna starost 50,6 godina. Istraživanje je pokazalo da su depresivnost, anksioznost i stres bili statistički značajno zastupljeniji kod ispitanika koji su od ranije imali kardiovaskularnu ili hroničnu respiratornu bolest u odnosu na ispitanike bez ovih bolesti. Takođe, i ispitanici koji su od ranije imali neku malignu bolest ili dijabetes melitus bili su značajno depresivniji i anksiozniji u poređenju sa ispitanicima bez ovih bolesti.

Zaključak. Rezultati ove studije mogu pomoći u kreiranju politika za unapređenje mentalnog zdravlja i sprečavanje mentalnih poremećaja kod osoba sa komorbiditetima.

Ključne riječi: mentalno zdravlje, hronične bolesti, pandemija COVID-19