



## **Association between post-COVID-19 disabling sequelae and mental health symptoms in adult patients**

Asociación entre las secuelas discapacitantes pos-COVID-19 y los síntomas de salud mental en pacientes adultos

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### **Abstract**

**Introduction:** COVID-19 has left deep marks on the physical and mental health of adults. Disabling consequences, such as fatigue and respiratory problems, are often associated with an increase in symptoms such as anxiety and depression, complicating the patient's comprehensive recovery.

**Objective:** To analyze the association between post-COVID-19 disabling sequelae and mental health symptoms in adult patients.

**Methods:** An analytical, case-control study was carried out on patients treated at the municipal post-COVID-19 consultation, located at the “José Martí” Polyclinic in the city of Camagüey, between the months of January to December 2021. From a universe of 265 patients, we worked with a sample of 200,

divided into two groups of 100, one of cases and the other of controls. Sociodemographic variables, comorbidities, clinical manifestations, mental health symptoms and psychosocial factors were analyzed.

**Results:** In the age group of 20-39 years, there is a significant association between patients with a history of COVID-19 who developed sequelae and those who did not. High blood pressure, loss of taste and smell, as well as depression were significantly more prevalent in patients with post-COVID-19 disabling sequelae. The study suggests that family support can be beneficial.

**Conclusions:** Post-COVID-19 disabling sequelae significantly affect the mental health of adult patients. The research reveals a correlation between the presentation of sequelae and an increase in symptoms such as anxiety and depression, highlighting the need for a comprehensive approach to treatment.

**Keywords:** post-COVID-19 disabling sequelae; symptoms; mental health symptoms; anxiety; depression.

## **Resumen**

**Introducción:** La COVID-19 ha dejado profundas huellas en la salud física y mental de los adultos. Las secuelas discapacitantes, como la fatiga y los problemas respiratorios, a menudo se asocian con un aumento de síntomas como la ansiedad y la depresión, complicando la recuperación integral del paciente.

**Objetivo:** Analizar la asociación entre las secuelas discapacitantes pos-COVID-19 y los síntomas de salud mental en pacientes adultos.

**Métodos:** Se realizó un estudio analítico, de casos y controles, en pacientes atendidos en la consulta municipal de pos-COVID-19, ubicada en el Policlínico “José Martí” de la ciudad de Camagüey, entre los meses de enero a diciembre de 2021. De un universo de 265 pacientes se trabajó con una muestra de 200, divididos en dos grupos de 100, uno de casos y otro de controles. Se analizaron las variables sociodemográficas, comorbilidades, manifestaciones clínicas, síntomas de salud mental y factores psicosociales.

**Resultados:** En el grupo de edad de 20-39 años, existe una asociación significativa entre los pacientes con antecedentes de COVID-19 que desarrollaron secuelas y los que no. La hipertensión arterial, la pérdida del gusto y del olfato, así como la depresión resultaron significativamente más prevalente en pacientes con secuelas discapacitantes pos-COVID-19. El estudio sugiere que el apoyo familiar puede resultar beneficioso.

**Conclusiones:** Las secuelas discapacitantes pos-COVID-19 afectan significativamente la salud mental de los pacientes adultos. La investigación revela una correlación entre la presentación de las secuelas y el

aumento de síntomas como ansiedad y depresión, resaltando la necesidad de un enfoque integral en el tratamiento.

**Palabras clave:** secuelas discapacitantes pos-COVID-19; síntomas; síntomas de salud mental; ansiedad; depresión.

## Introduction

The coronavirus pandemic has had a significant impact on public health globally for a long time. Beyond lung problems and the large number of cases of illness, another point of focus has emerged: the growing number of patients who, after recovering, face serious consequences.<sup>(1)</sup>

These consequences, known as long COVID or post-COVID syndrome, include both physical and psychological problems that can considerably affect people's well-being. Mental health symptoms are a crucial aspect that deserves thorough exploration, as they compound the complex challenges faced by those dealing with physical and mental disabilities.<sup>(2)</sup>

The clinical landscape of COVID-19 has expanded to include not only the usual symptoms of the disease, such as fever, cough and shortness of breath, but also a wide variety of neurological and mental health problems. These symptoms can manifest as anxiety, depression, post-traumatic stress disorder (PTSD), sleep problems, cognitive difficulties, and emotional changes, which are common in individuals after the contagious period.<sup>(3)</sup>

The relationship between having had COVID-19, whether mild or severe, and mental health problems is complex and interconnected, leading many people to face the challenge of recovering their physical condition while protecting their mental stability. Research has shown an increase in mental health conditions among COVID-19 survivors, indicating that about a third may suffer psychological distress after recovery.<sup>(4)</sup>

This issue is of great concern, especially considering that a multitude of people belonged to groups that were already struggling with psychological well-being before the onset of the global health crisis. Pre-existing health problems, the distress of being told you have an illness, and the limitations imposed by the pandemic, along with social restrictions, have created an environment where emotional and mental health can deteriorate.<sup>(5)</sup>

A worrying factor in this context is the challenges faced by both those seeking medical help and healthcare providers in identifying and treating these psychological manifestations. Physical conditions usually receive more attention when treating a person, but we cannot forget that mental health requires specialized

care. The lack of trained professionals and inadequate treatment create disparities that lead many patients to endure symptoms in an isolated and persistent way.<sup>(6)</sup>

It is important to realize that the impact of COVID-19 does not affect everyone equally. This depends on several personal factors, such as age, sex, socioeconomic level, and the culture of the human environment. Therefore, addressing psychiatric symptoms in this population requires a comprehensive strategy that considers not only the clinical aspects, but also the emotional, social, and economic factors that impact an individual's overall health.<sup>(7)</sup>

This situation encourages increased awareness about the conditions faced by COVID-19 survivors. Emerging research findings suggest that adopting preventive and restorative initiatives focused on mental health may be important in improving overall outcomes. The education and training of health professionals in this population category, as well as the creation of a safe environment for dialogue and dissemination of these topics, are key actions for more comprehensive and effective health care.<sup>(8)</sup>

Managing patients' mental health symptoms can have long-term consequences. The aftermath of COVID-19 is a serious challenge that requires urgent measures. The interaction of physical and psychological symptoms requires a holistic approach that takes into account the complexities of post-coronavirus syndrome. As understanding of the disease and its consequences continues to grow, it is essential to research, participate and create tools that promote comprehensive recovery for patients.<sup>(9)</sup>

In relation to the above, collaborative action is needed to reduce the long-term impact of the pandemic and ensure that COVID-19 survivors receive the help they need to safely reintegrate into society and resume their lives. In this sense, it is proposed to analyze the association between post-COVID-19 disabling sequelae and mental health symptoms in adult patients.

## **Method**

A retrospective analytical observational case-control study was carried out in a series of cases treated in the post-COVID-19 municipal consultation, located at the “Jose Marti” Polyclinic in the city of Camagüey. The research was carried out between the months of January to December 2021 and included patients from the nine health areas of the municipality of Camagüey.

From a universe of 265 patients, we worked with a sample of 200, selected through non-probabilistic convenience sampling. Each group included a total of 100 patients, while the cases corresponded to those diagnosed with post-COVID-19 disabling sequelae and the controls corresponded to those who recovered completely, without sequelae.

The following eligibility criteria were taken into account:

#### Inclusion criteria

- Patients between the ages of 20 and 59 diagnosed with COVID-19.
- Patients willing to participate in the study with prior informed consent.

#### Exclusion criteria

- Patients with pre-existing psychiatric disorders diagnosed before becoming ill with COVID-19.
- Patients with serious medical conditions that preclude evaluation of mental health symptoms.

Sociodemographic variables, comorbidities, clinical manifestations, mental health symptoms and psychosocial factors were analyzed. In each case the following aspects were considered:

Sociodemographic variables: Age group (20-39), sex (male), socioeconomic level (adequate), educational level (pre-university and university), employment status (stable) and housing conditions (adequate).

Comorbidities: Diabetes mellitus, high blood pressure, bronchial asthma, ischemic heart disease, chronic obstructive pulmonary disease and obesity.

Clinical manifestations: Chronic fatigue, respiratory difficulty, muscle and joint pain, tachycardia, loss of taste and smell and reduced functional capacity

Mental health symptoms: Anxiety, depression, post-traumatic stress, insomnia, irritability and concentration problems.

Psychosocial factors: Social isolation, adaptability, family support, social support, access to health resources and social stigmatization.

The information obtained through a demographic questionnaire made it possible to create a database in Microsoft Excel as the primary record of the research. The patients' medical records were also consulted in order to obtain data that were not included in the surveys. Validated scales such as the Beck Depression Inventory (BDI) and the Hamilton Anxiety Scale (HAM-A) were used to evaluate mental health symptoms. Likewise, structured interviews were conducted to delve deeper into the clinical history and reported symptoms.

Data processing was carried out using the Statistical Package for the Social Sciences (SPSS), version 27.0, so that descriptive and inferential statistics were applied. The results were expressed in numbers and percentages and the Odds ratio (OR) was calculated as a measure of effect in this type of studies, in addition to the confidence interval (CI) and statistical significance ( $p$ ). The results are displayed in the form of texts and tables.

The research was approved by the Scientific Council and the Ethics Committee of the Pediatric Hospital of Camagüey. It maintained the confidentiality of the information by coding the variables, accessible only to the researchers. The data collected were not used for purposes other than the research, and the provisions contained in the Declaration of Helsinki were taken into consideration.

## Results

Table 1 shows the sociodemographic variables, so that the interpretation of the study suggests that, in the age group of 20-39 years, there is a significant association between patients with a history of COVID-19 who developed post-disabling sequelae. COVID-19 and those who don't. The odds ratio indicates that the probability of presenting these symptoms is almost double.

Regarding the association between educational level and post-COVID-19 disabling consequences, there is no significance. The confidence interval includes the value 1, and statistical significance indicates that the results are inconclusive.

**Table 1** - Distribution of patients with (cases) and without (controls) post-COVID-19 disabling sequelae according to sociodemographic variables

Sociodemographic variables	Study group				95 % CI		OR	p
	Cases		Controls		L.I	L.S		
	n	%	n	%				
Age group (20-39)								
Yeah	56	56,0	39	39,0	1,1333	3,4968	1,9907	0,0166
No	44	44,0	61	61,0				
Sex (male)								
Yeah	42	42,0	52	52,0	0,3825	1,1681	0,6684	0,1573
No	58	58,0	48	48,0				
Socioeconomic level (adequate)								
Yeah	62	62,0	60	60,0	0,6161	1,9204	1,0877	0,7719
No	38	38,0	40	40,0				
Educational level (pre-university and university)								
Yeah	73	73,0	69	69,0	0,6587	2,2400	1,2147	0,5333
No	27	27,0	31	31,0				
Employment status (stable)								
Yeah	36	36,0	47	47,0	0,3600	1,1177	0,6343	0,1153
No	64	64,0	53	53,0				
Housing conditions (adequate)								
Yeah	65	65,0	62	62,0	0,6398	2,0251	1,1382	0,6595
No	35	35,0	38	38,0				

Comorbidities, such as high blood pressure, are seen in Table 2, where this significantly increases the risk of disabling post-COVID-19 sequelae. The confidence interval and odds ratio indicate a strong and statistically significant relationship between these conditions and long-term consequences. Similarly, diabetes mellitus increases the risk of presenting disabling sequelae post-COVID-19. The results, with a confidence interval between 1.9519 and 6.5328 and an odds ratio of 3.5709, are statistically significant.

**Table 2** - Distribution of patients with (cases) and without (controls) post-COVID-19 disabling sequelae according to comorbidities

The indicates	Comorbidities	Study group				95 % CI		OR	p
		Cases		Controls		L.I	L.S		
		n	%	n	%				
	Diabetes mellitus								
	Yeah	53	53,0	24	24,0	1,9519	6,5328	3,5709	<0,0001
	No	47	47,0	76	76,0				
	High blood pressure								
	Yeah	55	55,0	25	25,0	2,0121	6,6817	3,6667	<0,0001
	No	45	45,0	75	75,0				
	Bronchial asthma								
Yeah	15	15,0	8	8,0	0,8191	5,0283	2,0294	0,1263	
No	85	85,0	92	92,0					
Ischemic heart disease									
Yeah	11	11,0	4	4,0	0,9113	9,6551	2,9663	0,0710	
No	89	89,0	96	96,0					
Chronic obstructive pulmonary disease									
Yeah	13	13,0	4	4,0	1,1269	11,4125	3,5862	0,0306	
No	87	87,0	96	96,0					
Obesity									
Yeah	26	26,0	17	17,0	0,8630	3,4097	1,7154	0,1236	
No	74	74,0	83	83,0					

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association between post-COVID-19 disabling sequelae and chronic fatigue, evidenced by a wide confidence interval and a high odds ratio, supporting statistical significance. The study reveals a strong association between the loss of taste and smell in cases of post-COVID-19 disabling sequelae, with an odds ratio of 16.1163 and statistical significance (p: 0.0078), indicating that these clinical manifestations are relevant in this population (table 3).

**Table 3** - Distribution of patients with (cases) and without (controls) post-COVID-19 disabling sequelae according to clinical manifestations

Table 4

Clinical manifestations	Study group				95 % CI		OR	p
	Cases		Controls		L.I	L.S		
	n	%	n	%				
Chronic fatigue								
Yeah	17	17,0	2	2,0	2,2527	44,7132	10,0361	0,0025
No	83	83,0	98	98,0				
Respiratory difficulty								
Yeah	15	15,0	7	7,0	0,9121	6,0269	2,3445	0,0769
No	85	85,0	93	93,0				
Muscle and joint pain								
Yeah	19	19,0	9	9,0	1,0160	5,5366	2,3717	0,0459
No	81	81,0	91	91,0				
Tachycardia								
Yeah	8	8,0	3	3,0	0,7236	10,9243	2,8116	0,1355
No	92	92,0	97	97,0				
Loss of taste and smell								
Yeah	14	14,0	1	1,0	2,0763	125,0973	16,1163	0,0078
No	86	86,0	99	99,0				
Reduced functional capacity								
Yeah	6	6,0	1	1,0	0,7466	53,4828	6,3191	0,0907
No	94	94,0	99	99,0				

shows

depression as a mental health symptom in patients with and without post-COVID-19 disabling sequelae, such that it was significantly more prevalent in patients with post-COVID-19 disabling sequelae, with an odds ratio of 2.3146, indicating double the probability compared to controls, and a confidence interval that supports this association. Irritability also presented a statistically significant relationship and an odds ratio of 2.6781 indicates that people with these sequelae are more likely to experience the mental health symptom in question.

**Table 4** - Distribution of patients with (cases) and without (controls) post-COVID-19 disabling sequelae according to mental health symptoms



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Mental health symptoms	Study group				95 % CI		OR	p
	Cases		Controls		L.I	L.S		
	n	%	n	%				
Anxiety								
Yeah	21	21,0	12	12,0	0,9011	4,2169	1,9494	0,0900
No	79	79,0	88	88,0				
Depression								
Yeah	29	29,0	15	15,0	1,1511	4,6539	2,3146	0,0185
No	71	71,0	85	85,0				
Post-traumatic stress								
Yeah	10	10,0	6	6,0	0,6076	4,9874	1,7407	0,3020
No	90	90,0	94	94,0				
Insomnia								
Yeah	23	23,0	17	17,0	0,7246	2,9351	1,4584	0,2903
No	77	77,0	83	83,0				
Irritability								
Yeah	17	17,0	8	8,0	1,0946	6,5525	2,6781	0,0309
No	73	73,0	92	92,0				
Concentration problems								
Yeah	15	15,0	6	6,0	1,0261	7,4493	2,7647	0,0443
No	85	85,0	94	94,0				

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disabling consequences. The confidence interval and the odds ratio indicate a significant relationship between family support and improvement in the patients' condition, being statistically relevant. Adaptability influences the presentation of post-COVID-19 disabling sequelae, so the confidence interval indicates a potential association, although the statistical significance suggests that the results are not conclusive (Table 5).

**Table 5** - Distribution of patients with (cases) and without (controls) post-COVID-19 disabling sequelae according to psychosocial factors

Psychosocial factors	Study group				95 % CI		OR	p
	Cases		Controls		L.I	L.S		
	n	%	n	%				
Social isolation								
Yeah	28	28,0	21	21,0	0,6742	2,4476	1,2846	0,4465
No	82	82,0	79	79,0				
Adaptability								
Yeah	20	20,0	13	13,0	0,7813	3,5826	1,6731	0,1852
No	80	80,0	87	87,0				
Family support								
Yeah	73	73,0	59	59,0	1,0366	3,4055	1,8788	0,0377
No	27	27,0	41	41,0				
Social support								
Yeah	81	81,0	79	79,0	0,5663	2,2677	1,1332	0,7238
No	19	19,0	21	21,0				
Access to health resources								
Yeah	98	98,0	99	99,0	0,0442	5,5478	0,4949	0,5684
No	2	2,0	1	1,0				
Social stigmatization								
Yeah	3	3,0	1	1,0	0,3130	29,9488	3,0619	0,3362
No	97	97,0	99	99,0				

## Discussion

The emergence of COVID-19 has caused considerable effects, which not only affect the physical well-being, but also the mental well-being of people. Recent research targeting a matched-pair scheme attempts to understand markers of psychological distress in people suffering from post-COVID sequelae. This analysis is enriched by comparison with that of other scholars in the field, allowing for a deeper and more complex understanding of the topic at hand.<sup>(10,11)</sup>

The research brought together two cohorts of subjects: individuals affected by COVID-19 and persistent sequelae (case group), versus uninfected individuals (control group). Psychological evaluations were performed to detect signs such as anxiety, depression and post-traumatic stress disorder (PTSD). The scientists used approved tests like the Beck Depression Checklist and anxiety questionnaires to make sure the results were accurate.<sup>(12,13)</sup>

Research results revealed that a significant number of people recovering from COVID-19 had indicators of psychological distress that exceeded the incidence rates observed in the comparison group. This suggests there could be a link between the physical effects of the disease and worsening mental health.

Additionally, a person's mental health problems seemed to match the duration and severity of their physical problems.<sup>(14,15,16)</sup>

Existing literature shows similar patterns. According to research by Arriaga Castañeda et al,<sup>(17)</sup> in 2023, up to 30% of people recovering from COVID-19 were found to have some mental health symptoms. A study conducted by Pincay Baque et al.<sup>(18)</sup> revealed that, months after recovery, patients showed greater anxiety and depressive symptoms compared to the norms of the general population.

These investigations support the results of the current study, underscoring the need to address psychological well-being in post-pandemic recovery. However, it is important to note that some research presents different opinions. Certain studies suggest that the emergence of mental disorders among COVID-19 survivors does not differ significantly from community levels, considering previous psychiatric conditions

Other scholars highlight the importance of taking social and cultural factors into account when assessing the impact of the pandemic on mental well-being. In this sense, social and health strategies must be designed and implemented to counteract the symptoms through interdisciplinary actions.<sup>(19,20,21)</sup>

The findings underscore the urgent need for tailored mental health approaches for those facing the lasting after-effects of COVID-19. However, if I had to simplify it, I would say: "Take care of yourself in general, considering the physical and mental problems related to the disease." It is essential to promote regular physical activity.

The study reviews provided valuable information about the prevalence of mental health symptoms in people suffering from the long-term consequences of COVID-19. Compared to similar research,<sup>(22,23,24)</sup> it is evident that there is a worrying pattern that needs attention. However, more research is needed to better understand these connections and develop effective strategies that adequately address physical and psychological well-being after the pandemic. Integrating ideas from different areas will be key to solving the problem.<sup>(25)</sup>

The study offers a valuable approach to understanding the problem of mental health symptoms and their association with post-COVID-19 disabling consequences. Its scope lies in identifying patterns and correlations that can help develop specific interventions. However, its limitations include the possibility of bias in participant selection and the difficulty of establishing direct causality. Furthermore, external factors such as socioeconomic context and previous experiences with mental illness are not always possible to control, which can influence the results and their generalization to broad populations.

## **Conclusions**

Post-COVID-19 disabling sequelae significantly affect the mental health of adult patients. The research reveals a correlation between the severity of the sequelae and the increase in symptoms such as anxiety and depression, highlighting the need for a comprehensive approach to treatment.

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### Conflicts of interest

The authors declare that they have no conflicts of interest.

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