

THE IMPORTANCE OF THE MEDICAL REHABILITATION PROCESS IN THE CASE OF PATIENTS INFECTED WITH SARS-COV-2 VIRUS

Iuliu MOLDOVAN¹, Călina-Maria MUNTEANU², Septimiu VOIDAZAN^{2*}

¹Discipline of public health and health management University of Medicine, Pharmacy, Science and Technology George Emil Palade of Targu-Mures, 540141, Romania; iuliu.moldovan@umfst.ro

²Department of Epidemiology, University of Medicine, Pharmacy, Sciences and Technology George Emil Palade of Tîrgu Mureş, 540141, Romania; septimiu.voidazan@umfst.ro

* Correspondence: septimiu.voidazan@umfst.ro

INTRODUCTION

SARS-CoV-2 infection is a multisystem disease that produces long-term physical, mental, cognitive, social, and vocational sequelae among survivors. In most cases (80%), patients have a mild asymptomatic form or with minimal damage to the upper respiratory tract, approximately 14% of cases develop a severe form within the first 24-48 hours requiring hospitalization, whereas 5% of patients develop a critical form of the disease, requiring hospitalization in intensive care units [1, 2].

Post-SARS-CoV-2 virus infection effects include a wide range of signs and symptoms: myocarditis, endocarditis, strokes, venous thrombosis, post-traumatic stress syndrome [3, 4].

Recent analyses of the results of quarantine and similar prevention and control measures in the field of mental health have found that depression, anxiety disorders, mood disorders, symptoms of post-traumatic stress, sleep disorders, panic, stigma, low self-esteem, lack of self-control are very widespread among people affected by isolation [5-7].

Stressors such as prolonged quarantine, fear of infection, frustration, boredom, insufficient supplies, inadequate information, financial losses led to symptoms of long-lasting post-traumatic stress, confusion, and anger in the population [8, 9].

A study on the impact of the COVID-19 pandemic showed a 14.6% to 48.3% prevalence of symptoms of depression in the general population [10].

Although the psychological dimensions of COVID-19 have not yet been understood, previous studies suggest that infectious outbreaks critically affect the mental health of patients who may experience symptoms of anxiety, fear, and a lack of hope regarding uncertainties in relation to treatment and prognosis. Several factors influence the mental health of this vulnerable population, including isolation after diagnosis of the disease, stigma, prolonged hospitalization, and lack of social support [11-13].

SARS-CoV-2 infection is a multisystem disease that produces long-term physical, mental, cognitive, social, and vocational sequelae among survivors. The purpose of this study was to highlight the importance of physiotherapy and psychotherapy in the case of post-COVID-19 recovery as well as the general population's receptivity for these methods.

MATERIALS AND METHODS: A cross-sectional study was conducted using an online questionnaire/ survey. The first 5 questions were aimed at collecting demographic data (gender, age, background, level of education, income), whereas the following 25 viewed information about SARS-CoV-2 infection (opinion on the existence of the virus and the effectiveness of the vaccine, physical, social, and psychological impact, as well as openness to recovery methods). A sample of convenience of 203 people completed the questionnaire. Data collection took place between May and August 2023.

RESULTS: Of the respondents, 80.3% had experienced SARS-CoV-2 infection. Of the 170 who had been infected, 55.9% had a mild form, 20% moderate, and 24.1% severe. Of these, 71.2% required admission to the Intensive Care Unit and of these more than half required mechanical ventilation. Nearly three quarters (74.7%) of those who were infected did not seek the assistance of a physiotherapist, and almost the same percentage (70.2%) did not seek the help of a psychotherapist. **Conclusion:** The importance of physiotherapy and psychotherapy in post-COVID-19 recovery is vital, physical, and mental problems being much more numerous today than in the pre-COVID-19 era. The high cost of psychotherapy is still an important consideration that must be considered in the same way as that of physical therapy, as well as the lack of information of the population regarding the benefit of these methods of therapy.

Keys words: SARS-CoV-2, physiotherapy, psychotherapy, patient

In SARS-CoV-2 infection, these challenges may become more prevalent alongside psychosocial stressors experienced by people in general. Furthermore, several mental health problems may have coexisted between individuals and populations even before the onset of the pandemic [10], which may increase their susceptibility to negative mental health outcomes following a diagnosis of COVID-19 [14, 15].

According to a growing number of reports and studies, COVID-19 patients may experience depression, anxiety disorders, psychological distress, and suicidal behavior, [16, 17] and this requires a thorough understanding of mental health epidemiology during this pandemic.

COVID-19 also affects the mental health and well-being of health care professionals, especially among those who work as first-line providers. In addition, lack of social support, work under stress, guilt over suboptimal patient care or leaving understaffed hospitals, or worrying about their families can lead to critical mental health challenges among health care providers [18-20].

Counseling and psychotherapy have changed along with the SARS-CoV-2 pandemic. A multitude of issues arose that demanded new research to address the unique problems arising from SARS-CoV-2 infection. Due to the lack of information, people developed inappropriate social distancing behaviors that made it difficult for therapists to conduct their work. Another problem that specialists

faced was the reluctance of people regarding therapy or certain psychotherapy techniques [21].

Since insecurity is constant in everyone's life, and even more pronounced post-COVID-19, a method that has had results in psychotherapy has been the fact that therapists have joined their clients, capitalizing on their own fears and their own experience, thus teaming with the patient.

With the advent of COVID-19, many psychotherapists interrupted face-to-face therapy session to reduce the risk of infection, but the demand for therapy increased greatly compared to the pre-pandemic era. Thus, therapists had to adapt to working with patients remotely by telephone or by videoconferencing [22].

The purpose of this study was to highlight the importance of physiotherapy and psychotherapy in the case of post-COVID-19 recovery as well as the general population's receptivity for these methods.

MATERIALS AND METHODS

A cross-sectional study was conducted using an online questionnaire/ survey composed of 30 questions and delivered via Google Forms to determine the general population's compliance with the investigated recovery methods.

The first 5 questions collected the demographic data of the participants (gender, age, background, level of education, income), the following 25 contained information about the infection with SARS-CoV-2 (opinion on the existence of the virus and the effectiveness of the vaccine, the physical, social and psychological impact, as well as openness towards methods of recovery).

According to our study, people aged 45-54 and those living in urban areas were most affected by SARS-CoV-2 infection. The majority of those who were infected with the SARS- CoV-2 virus were female.

A sample of convenience of 203 people completed the questionnaire. Data collection took place between May and August 2023. The target population included patients aged 18-65 years, all of whom had the possibility to access the online questionnaire link distributed on social media platforms.

The participants were informed of the purpose of the study, ensuring anonymity and confidentiality of responses. Completing the questionnaire implied the consent of the respondents to participate in the study. The data obtained were entered into an Office Excel spreadsheet, and were subsequently processed statistically with the Statistical Package for Social Sciences (SPSS) software.

The software allowed for the statistical analysis of the participants' responses. Frequency tables were used, and chi-square type tests was applied for qualitative data. The statistical significance was set to $p=0.05$, values below this threshold having statistical significance.

RESULTS

1. Demographic characteristics of patients

Of the study participants, a percentage of 50.2% was represented by female respondents, 73.4% were urban residents. The ages of the respondents ranged from 18-65 years. Regarding the level of education, the highest percentage (46.8%) of the respondents had a higher education degree. Most of the participants (54.7%) claimed that they had an average income (RON 2,524), 24.1% high (between RON 7,000 and RON 10,000), 10.8% low (below RON 2,524), and 10.3% preferred not to disclose this information. (Table 1)

Table 1. Demographic characteristics of the respondents

Gender	Age-groups (years)	Residence	Education	Income
Female-50.2%	18-24-20.2%	Urban-73.4%	Primary-6.9%	Low-10.8%
Male-49.8%	25-32-16.3%	Rural-26.2%	High school-36%	Average-57.7%
	35-44-12.3%		Higher education- 46.8%	High-24.1%
	45-54-22.7%		Postgraduate-10.3%	Not disclosed- 10.4%
	55-64-15.8%			
	>65 years-12.8%			

According to our study, people aged 45-54 and those living in urban areas were most affected by SARS-CoV-2 infection. The majority of those who were infected with the SARS- CoV-2 virus were female.

2. Vaccinated and infected persons

As for vaccination, 92.1% of the participants were immunized as follows: 68.8% with the vaccine produced by Pfizer BioNTech, 14.8% with the vaccine Spikevax/ Moderna, 10.6% cu Johnson & Johnson's/ Janssen COVID-19 Vaccine the rest were vaccinated with AstraZeneca Vaxzevria Vaccine.

Most of the respondents (76.8%) stated that they believed that vaccination against COVID-19 was effective, 7.9% did not believe the vaccine was effective, while 15.3% did not know whether the vaccine was effective or not.

A percentage of 80.3 of the surveyed population had been infected by the SARS-CoV-2 virus. Of the 170 who had had the infection, 55.9% had a mild form, 20% moderate, and 24.1% severe. Of these, 71.2% required admission to the Intensive Care Unit and of these more than half required mechanical ventilation. (Table 2)

3. Consequences of SARS-CoV-2 infection

When participants were asked if there were new problems that worried them compared to their pre-COVID-19 condition, 73.1% claimed they had no new problems or symptom, while 26.9% of respondents had concerns due to new problems or symptoms.

When asked about the activities they could carry out without help, 85.2% of the respondents referred to work, 81.3% studying, 95.1% activities that did not require

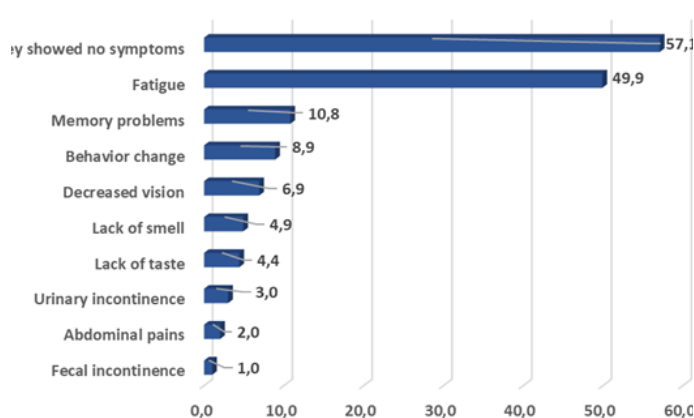
Table 2. People infected with SARS-CoV-2 virus. Vaccinated people

Have you been vaccinated?	Vaccine	Have you had the infection?	Form of infection	ICU admission	Mechanical ventilation
Yes-92.1%	Pfizer-68.8%	Yes-76.8%	Mild-55.9%	Yes- 71.2%	Yes-57.2%
No-7.9%	Moderna-14.8%	No-15.3%	Average- 4.1%	No-28.8%	No-43.3%
	Johnson & Johnson-10.6%	I do not know- 7.9%	Severe-20%		
	AstraZeneca- 5.8%				

physical effort, 88.2% domestic activities, 96.1% self-care and 94.1% maintaining relationships.

The question: “Are you currently experiencing one or more of the following symptoms?” revealed the following results: 40.9% “Fatigue”, 4.4% “Absence of taste”, 4.9% “Absence of smell”, 2% “Abdominal pain”, 3% “Urinary incontinence”, 1% “Fecal incontinence”, 6.9% “Decreased vision”, 10.8% “Memory problems”, 8.9% “Behavioral changes”, whereas more than half of the subjects (57.1%) did not show any of the above symptoms. The responses received to assess the prevalence of neurological and neuropsychiatric complications that may occur following infection with the SARS-CoV-2 virus are shown in Figure no. 1.

Figure 1. Prevalence of neurological and neuropsychiatric complications that may result from SARS-CoV-2 virus infection



The question: “Do you consider the post-COVID-19 rehabilitation process important?”

was answered positively by most of the participants 78.3%. Of the infected respondents, 74.7% did not seek the assistance of a physiotherapist, and almost the same percentage (70.2%) did not seek the help of a psychotherapist. Of the participants who did not turn to the psychotherapist or physiotherapist for assistance some did not consider deem it necessary, others were not informed of these possibilities and the benefits of these procedures, whereas most of the respondents stated that these were high-cost procedures.

The question: “Have you had deaths in your family or close people as a result of SARS-CoV-2 infection?” revealed that 23.2% of the respondents had lost family members and close people, the remaining 76.8% had not lost anybody.

In response to the question if they experienced the death of a close person, how they were affected 63.9% of participants reported being affected by the event, 27.8% stated they were not affected, and 8.3% were unsure.

When asked whether the isolation measures had repercussions, 50% of participants reported that these measures had an impact on them.

In response to the question, “In what ways were you affected by the SARS-CoV-2 infection?”, 66.4% of participants reported being affected socially, psychologically, and physically.

4. Rehabilitation following SARS-CoV-2 infection. Information methods. Level of trust in the health care system

In response to the question, “Do you currently consider that your life has returned to its pre-COVID-19 state of normalcy?”, 66.5% of participants reported that their lives had fully returned to pre-pandemic normality, 26.1% responded that their lives had partially returned to normal, while 7.4% stated that their lives had not returned to the pre-COVID-19 state of normalcy. The experiences of the pandemic period had some repercussions, normality meant something else during that period, access to medical services or the management of death cases were restricted.

The study group was asked whether trust in medical staff and their recommendations had been affected by government regulations or not. 70.4% of respondents had a high level of trust in health care providers, the others were reserved (17.2%) or displayed a low level of trust (11.8%).

In response to the question, “What changes do you believe should be made to the Romanian health care system?” 81.8% of participants indicated “Increased budget allocation for healthcare” 55.2% suggested “Improving the training level of medical staff through various study and specialization programs”, 51.7% advocated for “Depoliticizing the health care system”, while 2% believed that no changes were necessary.

In relation to the questions: “After discharge, did you seek the assistance of a physiotherapist?” and “your or your family’s income is...” people with middle income were those who sought the assistance of a physiotherapist in the highest proportion: 44.7%, 23.7% of those with low income, 13.2% of those with high income, and 18.4% of those who declined to specify income (p value-0.003, chi squared test).

In relation to the questions: “After discharge, did you seek the assistance of a psychotherapist?” and “your or your family’s income is ...”, the highest share occurred in people with middle income: 46.7%, 20% for those with low income, 17.8% for those with high income, and 15.6% for those who do not want to disclose their income (p value-0.025, chi squared test).

DISCUSSIONS

The SARS-CoV-2 virus infection and implicitly the pandemic caused by it had a significant impact on the population of the entire globe. The repercussions of COVID-19 are not limited to only one level, they include: physical, mental, and social damage. Physical impairment refers to the occurrence of post-COVID-19 sequelae that limit our daily activity, mental impairment includes anxious or depressive manifestations that have arisen because of the loss of close people or because of debilitating conditions acquired after infection, and social impairment can be the direct effect of isolation measures during the pandemic. Most of the participants in the study either personally had had the SARS-CoV-2 virus, or a person close to them had had the infection. Half of the participants stated that they were affected by the pandemic and the isolation measures, especially from psychological and social points of view.

Studies have expressed concern over the decline in people's mental health, as well as the repercussions to social and economic problems, of the multitude of changes due to the SARS-CoV-2 pandemic. Researchers say that, emotionally, each age group will certainly be affected differently by this pandemic. They state that insecurity and fear will lead to depression, anxiety, insomnia, and other problems for which psychotherapy is needed especially one that focuses on trauma exposure and loss management [23-25].

Another study from April 2021 highlights the fact that most patients infected with SARS-CoV-2 require prolonged hospitalization and mechanical ventilation, which can lead to multiple complications such as reduced respira-

tory capacity, musculoskeletal limitations that may persist for years after recovery, as well as psychological and even psychiatric issues. Physiotherapists play an important role in restoring normal functional capacity after SARS-CoV-2 infection, as they contribute to the prevention and rehabilitation of disease-related impairments, support functional independence, and facilitate the individual's social reintegration [26].

A study conducted in a small town in Libya between October 2020 and May 2021 enrolled subjects aged 18-65 years who were suffering from post-COVID-19 syndrome. This study assessed the effect of psychotherapy and physiotherapy in this group of patients. It was conducted under the supervision of specialists and found that physical and mental therapy had a marked role on the improvement of the general condition in these patients [27].

CONCLUSION

The importance of physiotherapy and psychotherapy in post-COVID-19 recovery is vital, with physical and mental problems being much more numerous today than in the pre-COVID-19 era. The high cost of psychotherapy is still an important consideration that must be taken into account in the same way as for physical therapy, as well as the lack of information of the population regarding the benefit of these methods of therapy. Therefore, there is a need for new methods to correctly inform all citizens regarding an optimal and complete post-COVID-19 medical rehabilitation in order to improve patients with post-COVID-19 syndrome.

References

1. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA*. 2020;323(13):1239–1242. doi:10.1001/jama.2020.2648
2. Pacnejer AM, Butuca A, Dobrea CM, Arseniu AM, Frum A, Gligor FG, Arseniu R, Vonica RC, Vonica-Tincu AL, Oancea C, Mogosan C, Popa Ilie IR, Morgovan C, Dehelean CA. Neuropsychiatric Burden of SARS-CoV-2: A Review of Its Physiopathology, Underlying Mechanisms, and Management Strategies. *Viruses*. 2024 Nov 21;16(12):1811. doi: 10.3390/v16121811.
3. Fernández-de-Las-Peñas C, Palacios-Ceña D, Gómez-Mayordomo V, Cuadrado ML, Florencio LL. Defining Post-COVID Symptoms (Post-Acute COVID, Long COVID, Persistent Post-COVID): An Integrative Classification. *Int J Environ Res Public Health*. 2021 Mar 5;18(5):2621. doi: 10.3390/ijerph18052621.
4. Taquet M., Luciano S., Geddes J.R., Harrison P.J. Bidirectional Associations between COVID-19 and Psychiatric Disorder: Retrospective Cohort Studies of 62 354 COVID-19 Cases in the USA. *Lancet Psychiatry*. 2021;8:130–140. doi: 10.1016/S2215-0366(20)30462-
5. Chaves C, Castellanos T, Abrams M, et al.: The impact of economic recessions on depression and individual and social well-being: the case of Spain (2006-2013). *Soc Psychiatry Psychiatr Epidemiol*. 2018; 53(9): 977–86
6. Hao F., Tan W., Jiang L., Zhang L., Zhao X., Zou Y., et al. (2020). Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain, Behavior, and Immunity*, 87, 100–106. doi: 10.1016/j.bbi.2020.04.069
7. Wickens CM, Popal V, Fecteau V, Amoroso C, Stoduto G, Rodak T, Li LY, Hartford A, Wells S, Elton-Marshall T, Hamilton HA, Taylor GW, Kupferschmidt KL, Agic B. The mental health impacts of the COVID-19 pandemic among individuals with depressive, anxiety, and stressor-related disorders: A scoping review. *PLoS One*. 2023 Dec 14;18(12):e0295496. doi: 10.1371/journal.pone.0295496.
8. Brooks SK, Webster RK, Smith LE, et al.: The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020; 395(10227): 912–20.
9. Marroquin B, Vine V, Morgan R. Mental health during the COVID-19 pandemic: effects of stay-at-home policies, social distancing behavior, and social resources. *Psychiatry Res*. 2020;293:113419.

References continues from the previous page

10. Xiong J, Lipsitz O, Nasri F, et al. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord.* 2020;277:55-64.
11. Lahav Y. (2020). Psychological distress related to COVID-19 –The contribution of continuous traumatic stress. *Journal of Affective Disorders*, 277, 129–137. doi: 10.1016/j.jad.2020.07.141
12. Guo Q, Zheng Y, Shi J, et al.: Immediate psychological distress in quarantined patients with COVID-19 and its association with peripheral inflammation: a mixed-method study. *Brain Behav Immun.* 2020; S0889-1591(20)30618-8.
13. Hossain MM, Purohit N, Sultana A, et al.: Prevalence of mental disorders in South Asia: An umbrella review of systematic reviews and meta-analyses. *Asian J Psychiatr.* 2020; 51: 102041
14. Hossain MM, Tasnim S, Sultana A, et al.: COVID-19 and suicide of an army soldier in India: perspectives on psychosocial epidemiology of suicidal behavior. *SocArXiv.* 2020.
15. Muruganandam P., Neelamegam S., Menon V., Alexander J., & Chaturvedi S. K. (2020). COVID-19 and severe mental illness: Impact on patients and its relation with their awareness about COVID-19. *Psychiatry Research*, 291, 113265. doi: 10.1016/j.psychres.2020.113265
16. Rogers JP, Chesney E, Oliver D, et al.: Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections : a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry.* 2020; 1–17.
17. Kang L, Ma S, Chen M, et al.: Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun.* 2020.
18. Huang Y, Zhao N: Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res.* 2020; 288: 112954.
19. Ferwana I., Varshney L.R. The Impact of COVID-19 Lockdowns on Mental Health Patient Populations in the United States. *Sci. Rep.* 2024;14:5689. doi: 10.1038/s41598-024- 55879-9.
20. Walton M, Murray E, Christian MD: Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur Hear J Acute Cardiovasc Care.* 2020; 9(3): 241–247.
21. Sriati A, Kurniawan K, Senjaya S, Khoirunnisa K, Muslim RNI, Putri AM, Aghnia N, Fitriani N. The Effectiveness of Digital-Based Psychotherapy in Overcoming Psychological Problems in College Students During the COVID-19 Pandemic: A Scoping Review. *J Holist Nurs.* 2024 Jun;42(2_suppl):S26-S39. doi: 10.1177/08980101231162990.
22. Harrer M., Apolinário-Hagen J., Fritsche L., Salewski C., Zarski A. C., Lehr D., Baumeister H., Cuijpers P., Ebert D. D. (2021). Effect of an internet- and app-based stress intervention compared to online psychoeducation in university students with depressive symptoms: Results of a randomized controlled trial. *Internet Interventions*, 24(January), 100374. 10.1016/j.invent.2021.100374
23. Vostanis P, Bell CA. Counselling and psychotherapy post-COVID-19. *Couns Psychother Res.* 2020 Sep;20(3):389-393. doi: 10.1002/capr.12325.
24. Niederkrotenthaler T, Laido Z, Kirchner S, Braun M, Metzler H, Waldhör T, Strauss MJ, Garcia D, Till B. Mental health over nine months during the SARS-CoV2 pandemic: Representative cross-sectional survey in twelve waves between April and December 2020 in Austria. *J Affect Disord.* 2022 Jan 1;296:49-58. doi: 10.1016/j.jad.2021.08.153.
25. Shekhar S, Ahmad S, Ranjan A, Pandey S, Ayub A, Kumar P. Assessment of depression, anxiety and stress experienced by health care and allied workers involved in SARS-CoV2 pandemic. *J Family Med Prim Care.* 2022 Feb;11(2):466-471. doi: 10.4103/jfmpe.jfmpe_2518_20.
26. Paz LES, Bezerra BJDS, Pereira TMM, da Silva WE. COVID-19: the importance of physical therapy in the recovery of workers' health. *Rev Bras Med Trab.* 2021 Apr 30;19(1):94-106. doi: 10.47626/1679-4435-2021-709.
27. Emammer, E. K., Omar, R. A., Alhammali, A. H., Muthanna, F. M. S., & Ibrahim, H. K. The role of physical therapy in post-coronavirus syndrome: A pilot study. *International Journal of Health Sciences*, 2022, 6(S6), 8180–8187. <https://doi.org/10.53730/ijhs.v6nS6.1225>