

ORIGINAL STUDY

The impact of a multidisciplinary approach on elderly patients hospitalized with SARS-CoV-2

Andreea Salcudean¹, Anca Gabriela Vlad², Adriana Neagos^{3,4}, Cristian Mircea Neagos⁴

¹Department of Psychiatry, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Targu Mures, Romania

²Intensive Care Department, Emergency County Hospital, Targu Mures, Romania

³Department of Otorhinolaryngology, Emergency County Hospital, Targu Mures, Romania

⁴Department of Otorhinolaryngology, "George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology, Targu Mures, Romania

ABSTRACT

BACKGROUND. The COVID-19 pandemic had a devastating impact in terms of both somatic and mental morbidity. The most vulnerable group of patients is represented by the elderly, due to their global fragility. During the COVID-19 pandemic, research have stated that age and related comorbidities are associated with the outcome and evolution of the coronavirus infection.

MATERIAL AND METHODS. We performed a prospective observational study by applying a specific unsystematized questionnaire containing 21 questions, including patients admitted between 01.10.2021-16.03.2022 in the Internal Medicine Clinic and the Infectious Diseases Clinic COVID-19. Two hundred patients were included in the study of which the most important group was represented by the elderly. The current study aimed to demonstrate the clinical complexity of the patients hospitalized with SARS-CoV-2 and the importance of a multidisciplinary approach.

RESULTS. Among those patients who complained of cardiovascular symptoms such as tachycardia, palpitations, chest pains, 59.6% had no cardiac pathology, therefore they required psychiatric examination and specific anxiolytic and/or antidepressant treatment. Despite the fact that alarmingly low rates of vaccination were observed, we noticed a statistically significant association between the presence of insomnia and vaccination status: half of the vaccinated stated that they sleep as well as usual, compared to only 22.8% of the unvaccinated. We also found a statistically significant association between the presence of insomnia and peripheral oxygen saturations below 93%.

CONCLUSION. The results of our study highlight the importance of a multidisciplinary management of the SARS-CoV-2 infection, especially targeting the elderly and fragile patients.

KEYWORDS: COVID-19, multidisciplinary, elderly, comorbidities.

INTRODUCTION

After more than 3 years since the start of the COVID-19 pandemic, this pathology still affects the population of the entire planet. Throughout more than 3 years of continuous struggle, numerous studies have been published regarding the devastating impact of this disease. If at first it was thought to be a purely respiratory pathology, studies have shown that

SARS-CoV-2 infection has a multisystemic involvement, which led to the continuous discovery of the pathophysiology as well as the anatomopathological changes of the disease. The somatic as well as the neuropsychological implications led to the need for a multidisciplinary approach and expertise to provide the best treatment management of the infection. Certain population groups require special attention regarding the treatment and the recovery. Elderly patients present

Corresponding author: Neagos Adriana, Associate Professor, MD, PhD, "George Emil Palade" University of Medicine, Pharmacy, Science and Technology, 34 Gh. Marinescu Street, Targu Mures, Romania

ORCID: <https://orcid.org/0000-0002-9299-2638>

e-mail: neagos.adriana@gmail.com

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a particular fragility in general, which makes them more vulnerable to SARS-CoV-2 infection and sequelae.

The complexity of COVID-19 has been evident since the infection was declared an international public health emergency situation¹.

Hospitalized patients with COVID-19 require a multidisciplinary approach, as the infection can lead to a variety of clinical scenarios. In most cases, patients are hospitalized for respiratory failure, which requires oxygen supplementation, including mechanical ventilation in some of the most unfavourable scenarios². A group of patients infected with COVID-19 can rapidly progress to acute respiratory distress syndrome (ARDS), often associated with multiple organ failure or sepsis requiring intensive care admission².

The involvement of the central nervous system in the infection with COVID-19 has been observed since the early stages of the pandemic, with the appearance of symptoms like anosmia or ageusia³. In addition, other neurological manifestations, such as meningoencephalitis and stroke, have been reported, discoveries later relating the events to the prothrombotic state present in SARS-CoV-2 infection⁴. Gastrointestinal symptoms including vomiting, abdominal pain, and diarrhea, may be an early manifestation of COVID-19 disease, and some studies suggest that the symptoms may indicate a higher likelihood of a severe evolution, conflicting other studies evocating the attenuating role of the gastrointestinal system in the inflammatory response of SARS-CoV-2 infection^{5,6}.

Cardiovascular manifestations of COVID-19 including myocarditis or acute coronary syndromes, as well as venous thromboembolism, also dictate hospitalization and immediate treatment⁷. Last but not less important, a global burden of mental illnesses has been associated with the current pandemic. The pandemic has induced adverse psychological outcomes in the general population ranging from anxiety and depression to fear and suicidal ideation. Studies on the neurotrophic properties of severe acute respiratory syndrome coronavirus were conducted in order to elucidate potential neuropathogenic pathways involved in the viral invasion of the central nervous system as a cause for brain damage and neuropsychological impairments. Poor sleep was also associated with bad clinical outcomes in hospitalized patients with COVID-19⁸.

A particular group of patients represented by the geriatric population could present atypical COVID-19 symptoms without fever and also a rapid development of multiple organ dysfunction. Elderly patients tend to have more complications and are more likely to be admitted in intensive care units than younger populations⁹.

Given the complexity of the SARS-CoV-2 infection, it is mandatory to implement the best multidisciplinary management, especially regarding the most vulnerable population groups such as elderly or infants.

MATERIAL AND METHODS

We performed a prospective observational study by applying a specific unsystematized questionnaire containing 21 questions, including patients admitted between 01.10.2021-16.03.2022 in the Internal Medicine Clinic and the Infectious Diseases Clinic COVID-19 departments, at "Dr. Valer Russu" Hospital in Ludus. Two hundred patients were included in the study.

The study group was structured according to general data including gender, age, environment of origin, medical data including vaccination status against SARS-CoV-2, clinical and paraclinical investigations (blood panel, peripheral oxygen saturation as percentage), acute and chronic psychiatric treatment, comorbid pathologies.

The investigated variables were of the nominal qualitative type, dichotomous qualitative and primary quantitative.

The extracted data was entered into an Excel database. Statistical processing was performed using the statistical software: GraphPad Prism V6.01 for Windows and the SPSS V20 package (IBM). Calculated descriptive statistics indicators include: skewness and skewness of the distribution curve, minimum value, maximum value, standard deviation, mean, standard error, mode, median, and variance. Continuous variables were expressed as mean $\pm$ standard deviation (SD), categorical variables are presented as number and percentage.

For the analysis of categorical data, we made contingency tables and used the significance test for quantitative effects Chi-square (for values greater than 5) or the Fischer test (for values less than 5).

The significance threshold chosen was $\alpha=0.05$, and p was considered significant when $p \leq \alpha$.

RESULTS AND DISCUSSIONS

Our findings indicate that 110 (55%) of 200 patients infected with COVID-19 were aged between 71-95 years, 34% aged between 46-70 years and only 11% were aged between 20-45 years. According to Centers for Disease Control and Prevention, geriatric patients are more likely to develop severe COVID-19 infection that might require prolonged hospitalization, intensive care, or mechanical ventilation support. The risk starts to increase for people in their 50s and substantially increases in 60s, 70s, and 80s. People 85 and older are the most likely to develop fulminant and deadly forms of infection. Factors that can also contribute to the severity of the COVID-19 infection are certain underlying medical conditions. Regarding the environment, no important differences were observed among our studied group, 109 patients were located in the rural area, totalling a percentage of 54.5%, and 91 were living in urban areas, with a percentage of 45.5%.

In our study, we also observed alarmingly low rates of vaccination (8%).

An association was observed between patients' gender and

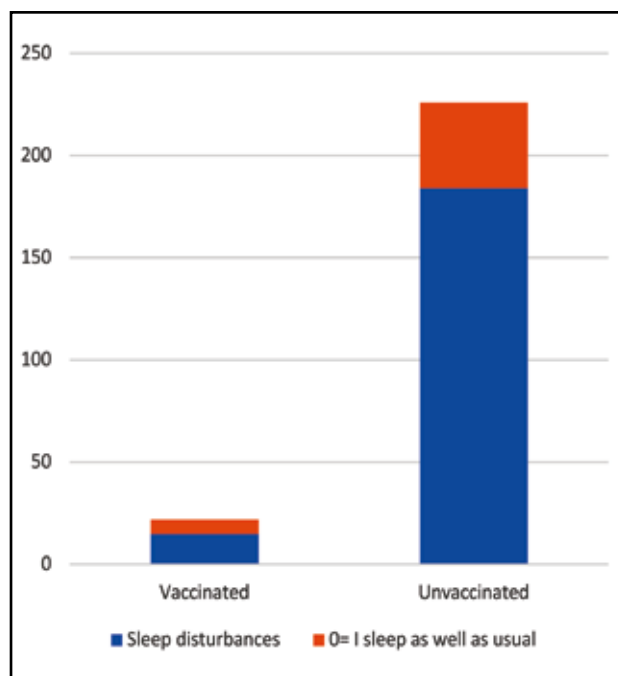
Table 1. Association between gender and vaccination status.

		Unvaccinated	Vaccinated	p-value
Agree somewhat	males	44%	62.50%	0.001
	females	56%	37.40%	

vaccination status, $p=0.001$. Males present a significantly more frequent vaccination rate compared to females, 62.5% compared to 37.4%. (Table 1).

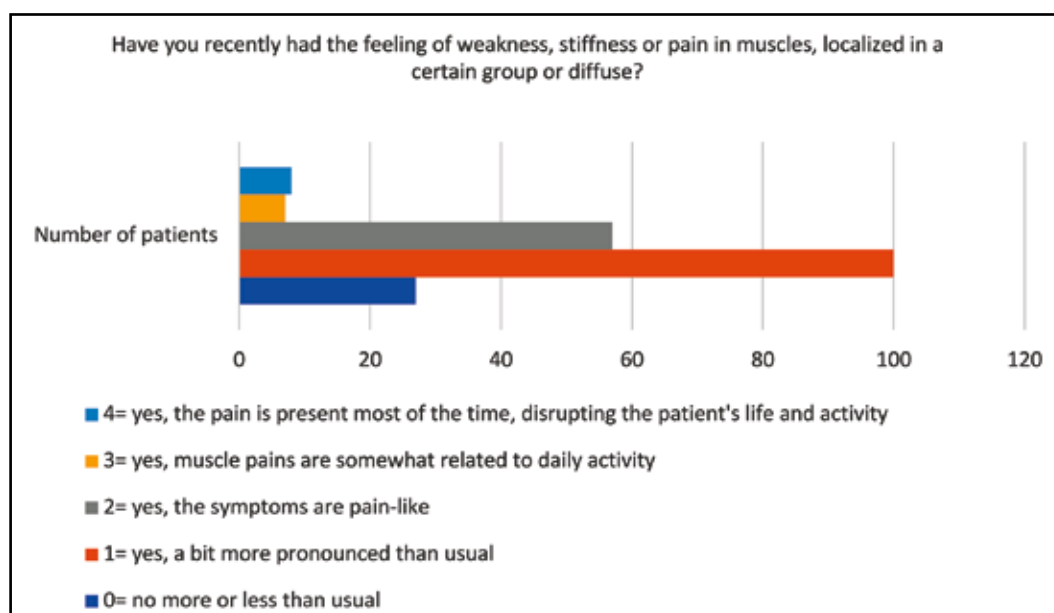
We found a statistically significant association between the presence of insomnia and vaccination status, $p=0.007$. Patients who are not vaccinated “do not sleep as well” compared to those who are vaccinated, while 46.70% of those vaccinated sleep just as well as before the pandemic (Figure 1). Besides the feeling of hope, relief and insurance the vaccination can have for one individual, studies also indicate the beneficial role of a good sleep after vaccination in boosting the immunological memory¹⁰.

There was an association between the administration of anxiolytic treatment (chronically or in-hospital) and question 10 (“Have you recently had the feeling of weakness, stiffness or pain in muscles, localized in a certain group or diffuse?”) (Figure 2), $p=0.004$. A percentage of 57% of the patients who answered with “3 = yes, the muscle pains are in some relation with the daily activity” are patients taking anxiolytic treatment. Also, we observed that 87.5% of the patients who answered with “4 = yes, the pain is present most of the time,

**Figure 1.** Correlation between insomnia and vaccination status.

disrupting the patient’s life and activity” are also patients taking anxiolytic treatment.

A percentage of 59.4% of patients with SpO₂=94-99% stated that “1= I no longer sleep as well as usual”, along with 40.9% with SpO₂=87-93% and 53.8% with SO₂=60-86%. A proportion of 15.4% of those with SO₂=60-86% stated that “4= I wake up with a few hours earlier than before and I can no longer fall asleep due to thoughts associ-

**Figure 2.** Association between the administration of anxiolytic treatment and the question “Have you recently had the feeling of weakness, stiffness or pain in muscles, localized in a certain group or diffuse?”

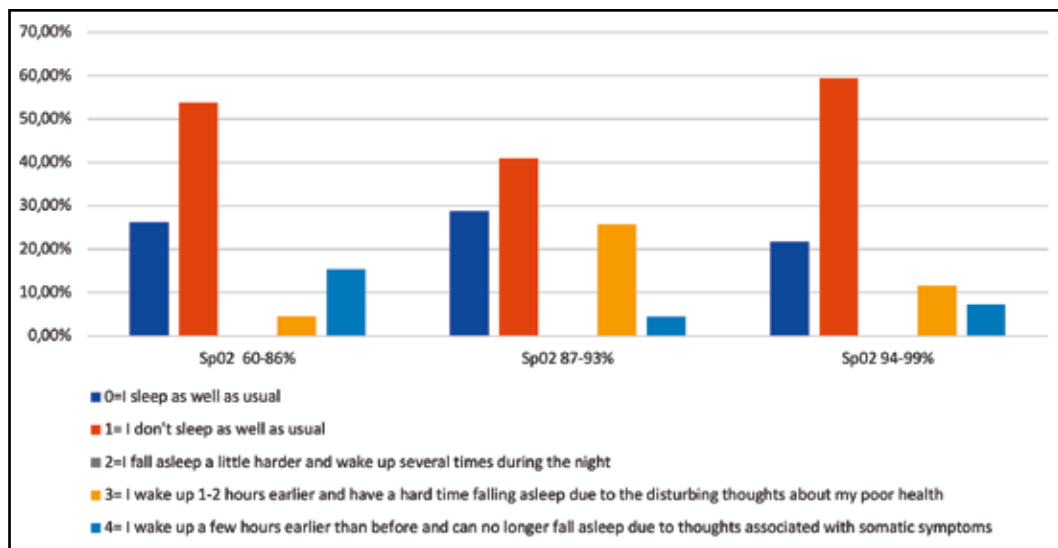


Figure 3. Correlation between SpO2 saturation and sleep disturbances.

Table 2. Answer options regarding cardio-vascular symptoms.

Have you ever had cardiac symptoms such as tachycardia, palpitations, chest pain, chest constriction?

0= no symptoms

1= possible, but difficult to confirm

2= present but kept under control

3= present, sometimes difficult controlling them, so that they interfere with the patient's life and activity

4= symptoms are present most of the time, disrupting the patient's life and activity

ated with various somatic symptoms" ($p=0.001$) (Figure 3). The decrease in oxygen saturation leads to increased discomfort in terms of sleep, patients not being able to rest due to symptoms of respiratory insufficiency or other somatic manifestations and also due to the thoughts associated with unpleasant somatic manifestations (dyspnoea, chest constriction, suffocation).

We found a statistically significant association between vaccination status and concerns regarding the quality of health ($p=0.044$). 62.5% of those vaccinated stated that they "do not have any concerns and they try to have a balanced life", while 47.8% of the unvaccinated state that they "only worry when they feel really bad and go to a doctor for a correct treatment". According to studies, receiving a COVID-19 vaccine was associated with declines in distress, lower odds of anxiety and/or depressive symp-

Table 3. Anxiolytic treatment – risk factor for low oxygen levels?

Data analysed	Anxiolytic	No anxiolytic	Total
SpO2<94	45	116	161
SpO2>93	12	27	39
Total	57	143	200
Test	Fisher's exact test		
P value	0.6981		
P value summary	ns		
One- or two-sided	Two-sided		
Statistically significant ($p < 0.05$)	No		
Odds ratio	0.8728		

toms and lower risks of infection, hospitalization, and mortality, in this way encouraging the vaccination campaigns to promote these additional benefits of the COVID-19 vaccine¹¹.

We also found an association between gender and the state of uncertainty, irritation, fear, insecurity in relation to health status and post SARS-CoV-2 infection recovery ($p=0.002$). Women (33.3%) more frequently have a state

of moderate uncertainty (low moods more than 50% of the time) compared to men (25.3%). A study in the United States of America tested whether older adults and in particularly older men would report the least amount of COVID-19 pandemic-related worry. Starting from the hypothesis that worry occurs less frequently for older rather than younger adults, and less frequently for men than women, the study demonstrated that elderly men tend to worry less and highlights the importance of understanding emotional responses to COVID-19, as prediction of behavioural responses¹².

In order to demonstrate if there is a correlation between cardio-vascular symptoms and psychiatric treatment, we asked the patients if they “ever had cardiac symptoms such as tachycardia, palpitations, chest pain, chest constriction?” (possible answer options are presented in Table 2).

Among patients receiving psychiatric treatment, they answered with “= present, sometimes difficult controlling them, so that they interfere with the patient’s life and activity” in a proportion of 59.6%, compared to 28.7% of those without treatment. Only a percentage of 5.3% denied the presence of cardiovascular symptoms among those in need of psychiatric treatment, compared to 29.4% without medication ($p=0.0001$).

We wanted to observe if there is an association between anxiolytic treatment and oxygen saturation (Table 3). Our results indicated that the anxiolytic treatment is not a risk factor for decreased saturation levels (based on the p significance – $p>0.05$), according to our studied group, but OR – odds ratio = 0.8728. Further studies must be conducted in order to elucidate if the anxiolytic treatment in patients with COVID-19 is appropriate or it can worsen the outcome of the SARS-CoV-2 infection.

CONCLUSIONS

We observed that more than 50% of the 200 patients admitted in COVID-19 supportive units were aged between 71-95 years. It is important to understand that a multidisciplinary approach must be implemented in order to best manage the geriatric COVID-19 cases. Our study found a significant correlation between gender and vaccination status, observing that males are more likely to vaccinate. Increased distress and worry related to adverse reactions of the vaccine may contribute to the gender difference. We found that females tend to have a higher state of uncertainty regarding their health status compared to men. It is widely studied that men, and in particular older men, tend to worry less than females. We also observed that vaccination can work as a protective factor against insomnia: unvaccinated patients do not sleep as well compared to those who are vaccinated. Vaccination can also lower the concerns on quality of health so that vaccinated

patients manage to have a balanced and less distressed life. Cardio-vascular symptoms are sometimes difficult to control and interfere with patients’ daily activity among patients receiving psychiatric treatment, so that further studies are necessary to document the mechanisms of this manifestations. Objective investigations such as peripheral oxygen saturation (as percentage) can be related to sleep routines, so that we observed that decreased oxygen saturations can disturb patients’ sleep patterns, patients not being able to rest due to symptoms of respiratory insufficiency or other somatic manifestations and also due to the thoughts associated with unpleasant somatic manifestations (dyspnoea, chest constriction, suffocation).

It is mandatory to implement multidisciplinary therapeutic protocols in order to efficiently manage COVID-19 infections, especially regarding the fragile elderly and to lower the long-term sequelae related to the infection.

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Authors’ information:

Andreea Salcudean, MD, PhD, Lecturer, “George Emil Palade” University of Medicine, Pharmacy, Sciences and Technology, Department of Psychiatry, Targu Mures, Romania. E-mail: andreea.salcudean@yahoo.com. ORCID: <https://orcid.org/0009-0001-6367-4999>.

Anca Gabriela Vlad, MD, Intensive Care Department, Emergency County Hospital, Targu Mures, Romania. E-mail: ancavlad2@gmail.com. ORCID: <https://orcid.org/0009-0009-2294-249X>.

Adriana Neagos, Associate Professor, MD, PhD, “George Emil Palade” University of Medicine, Pharmacy, Sciences and Technology, Department of Otorhinolaryngology, Emergency County Hospital, Targu Mures, Romania. E-mail: neagos.adriana@gmail.com. ORCID: <https://orcid.org/0000-0002-9299-2638>.

Cristian Mircea Neagos, ENT Resident, Department of Otorhinolaryngology, “George Emil Palade” University of Medicine, Pharmacy, Sciences and Technology, Targu Mures, Romania. E-mail: cristian.neagos@gmail.com. ORCID: <https://orcid.org/0009-0008-7249-5395>.

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