Duration of symptoms caused by COVID-19 in patients discharged from tertiary hospitals in Ceará

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Abstract

Despite advances in knowledge about COVID-19, little is known about the course of the disease and its long-term outcomes. Therefore, post-pandemic research has focused on the sequelae and complications caused by the Coronavirus. Thus, the objective was to investigate symptomatological remains and their duration of discharged patients hospitalized for COVID-19 from three regional hospitals in Ceará. This is a descriptive, analytical cross-sectional study with a quantitative approach carried out from August to October 2021 through telesurvey. The final sample consisted of 49 patients in the first wave of the pandemic and 153 in the second, totaling 202 participants. Data were tabulated in an Excel® spreadsheet and analyzed according to descriptive statistics. There is a prevalence of male patients, 31 (63.3%) in the first period investigated, and 86 (56.2%) in the second wave. In the investigation of physical symptoms, fatigue/tiredness stood out, identified in 23 (46.9%) and 69 (45.1%) individuals according to the wave, followed by a lack of appetite in 13 (26.5%) and (40.5%). Shortness of breath was highlighted in the second period among 39 (25.5%) individuals. Symptoms such as memory loss, cough, and chest pain appear to be the most lasting, and were prevalent for up to 4 months after hospital discharge. While in the 2nd wave chest pain was cited lasting up to 6 months. In this context, this study exposes the main symptoms reported, pointing to the imminent need for public strategies for monitoring and intervention services with these patients.

Keywords: COVID-19 virus disease. Coronavirus. Symptom assessment. Tracking.

INTRODUCTION

The prevalence of people affected by CO-VID-19 represented an exorbitant amount in the world health scenario, since it is an unexpected event of significant magnitude in the epidemiological scenario. In view of the facts, the challenges were urgent due to the high rates of contamination in a short period, without proper impact forecasts and a contingency plan not in place[1].

The course of the disease remains unk-nown by health authorities, even so that the major symptomatology tends to vary in the current scenario[2]. In the same vein, the outcome and clinical manifestations caused by the Coronavirus crosses the urgency and emergency sectors as the patient's gateway, into the Intensive Care Unit (ICU) in critical care and the clinic after COVID-19.

In view of the discussion addressed in the study, what can be referred to as a post-

-pandemic investigation with a focus on the sequelae and complications caused by the Coronavirus. This symptomatological storm is uncertain because the signs appear in a mild, moderate, or severe state according to the involvement of each specific case[3]. In this premise, post-hospital investigations gain prominence as a new panorama of care directed to the possible damaged caused.

Along these lines, it is also worth mentioning the factors of variance which are classified as possible variables directly or indirectly related to each type of symptom during the analytical process. Moreover, such events can be delineated by physiological systems or symptom categories, by the very issue of pathological tropism or preexisting comorbidity, for example, cardiovascular, neurological, rheumatological, hematological complications, among others[4,5].

Similarly, the stage of onset of the first symptoms can also indicate certain factors, that is, acute symptoms which occur immediately after discharge or hospital transfer, and chronic symptoms which over the course of a few months. Data published in the clinical literature have highlighted the dysfunction of organs and systems in line with the time of disease development and unique therapeutic choices, which in a way still become inconclusive because they deal with a survey that still has investigative concomitance[6]. However, the patient as a central object of study prioritizes the reliability of these data in considerable amounts of samples.

It is essential to insist on the fact that the different regions and populations tend to show different paradigms, especially in the Brazilian reality, due to the variation of health systems in a more general approach, and the multiple ethnicities of specific groups present throughout the territory. Therefore, the present study aimed to investigate symptomatological remains and their duration among patients discharged from COVID-19 hospitalization in three regional hospitals in Ceará.

METHODOLOGY

This is an analytical, descriptive, cross-sectional study with a quantitative approach carried out from August to October 2021. To carry out the study, considering the epidemiological scenario, telesurvey by telephone calls was chosen. The model stands out for its high capacity for remote execution while reducing research costs. It is ensured that in order to reduce bias and secure the findings, it is important to build a protocol faithfully followed during the collection activities[7,8,9].

Aiming at the reliability of the execution, a protocol was created for the contact of the participants. Thus, each participant was contacted at most twice a day, if the first call was not successful, with an average interval of five minutes between calls. In continuity, this action was carried out for three consecutive days, as long as there was no success in the previous days.

Data collection took place through telephone contact with patients who were previously hospitalized for COVID-19 in three tertiary hospitals of the SESA network in Ceará, located in the cities of Sobral, Juazeiro do Norte, and Quixeramobim. The list of pa-

tients with a telephone available was sought to guide the calls. The sample of patients was strategically divided between first and second waves according to epidemiological criteria in the state of Ceará, which mark the peak of contamination by COVID-19 in the state. Thus, the contamination curve that corresponds to the first wave comprises the period from April to June 2020 while the second wave comprises January to April 2021, according to the Ceara indicator panel. Thus, convenience sampling was used, considering the available phone numbers offered. At the end of the connection attempts, the sample consisted of 49 patients in the first wave and 153 in the second, totaling 202 participants. Patients with a positive RT-PCR diagnostic test and with an initial outcome of discharge or transfer were included. Patients who were not located via telephone, or in case of refusal to receive a phone call, were excluded.

During the calls, the data was filled in through a specific form. The dialogue began with questioning socioeconomic and demographic questions such as age and profession, type of attendant (patient or family member/friend), discharged with oxygen (O2), support device and duration, situation after discharge at home/residence, readmission, and assessment of general health status post-COVID-19.

The instrument was primarily organized into two axes, the first being "physical symptoms", which contained: loss of smell (anosmia), loss of taste (ageusia), lack of appetite, chest pain, headache, cough, fever, loss of memory, fatigue/tiredness, abdominal pain, nausea, diarrhea, chills, shortness of breath, difficulty walking, arthralgia, myalgia, alopecia, and weight loss.

The second axis was composed of possible complications related to the Coronavirus, and were classified as thrombotic events, dependence for activities of daily living (ADLs), alteration in kidney function, alteration in cardiac function, alteration in pulmonary function, alteration in neurological function, and alteration in gastrointestinal function. Regarding psychological/psychiatric symptoms, anxiety, anguish, fear of dying, insomnia, and behavioral-cognitive changes were listed.

All data were tabulated in an Excel® spreadsheet and organized according to the records obtained during the study to generate graphs and tables. The analysis was based on descriptive statistics for each categorical variable, thus using relative and absolute frequency.

The study was approved by the Research Ethics Committee of the Ceara School of Public Health, number 3.948/100, following the ethical precepts of CONEP resolution 466/12 regarding research involving human beings.

RESULTS

In view of the findings made possible by the telesurvey, referring to sociodemographic and economic data, Table 1 shows a higher prevalence of call being answered by third parties both in the first wave (n=43; 87.8%) and in the second (n=122; 79.7%). Of these, most had direct family ties with the participant, with 47 (95.9%) individuals in the first wave and 127 (83%) in the second wave. There is a prevalence of male patients, with a frequency of 31 (63.3%) individuals in the first wave investigated, and 86 (56.2%) in the

second, although a considerable increase in the proportion of females is noted. Along the same lines, the age group from 50 to 59 years old showed a greater number of patients in the first wave with 9 (18.4%) individuals and in the second with 39 (25%) individuals.

When investigating income and profession in the economic aspect, there was a greater number of participants who claimed to have some type of paid activity, with 55.1% (n=27) in the first wave in 2020, with the same threshold value of 62.7% (n=96) in the second wave in 2021 (Table 1).

Table 1 – Sociodemographic data of discharged patients hospitalized for COVID-19 from three hospitals in the State of Ceará, Brazil. 2022

Variables	First wave n= 49 (2020)		Second wave n= 153 (2021)	
	n	%	n	%
Type of attendant				
Patient	6	12.2	31	20.3
Other	43	87.8	122	79.7
Type of connection				
Family	47	95.9	127	83
Not family	2	4.1	26	17
Sex				
Male	31	63.3	86	56.2
Female	18	36.7	67	43.8
Age range				
0 to 19 years:	0	-	4	2.6
20 to 29	8	16.3	15	9.6
30 to 39 years	6	12.2	16	10.3
40 to 49 years	3	6.1	17	10.9
50 to 59 years	9	18.4	39	25
60 to 69 years	8	16.3	35	22.4
70 to 79 years	8	16.3	18	11.5
80 years or older	7	14.3	12	7.7
Income				
Paid activity	27	55.1	96	62.7
Unpaid activity	15	30.6	42	27.5
No activity	7	14.3	15	9.8

The data present in what corresponds to the investigation of the patient's situation after hospitalization, the data show that most of those investigated had hospital discharge as an outcome, with 49 individuals in the first wave, and 153 in the second. There is a low percentage of readmissions with around 2 (4.1%) in the first wave compared to 3 (2%) in the second

wave. Considering the discharge with O2, only 1 (2%) individual in the first period used a nasal catheter, while 3 (1.9%) in the second used O2 support, and the use of a mask with reservoir was more prevalent with 2 cases (1.3%). As for the follow-up of post-COVID19 patients, in the first wave, 47 (95.9%) remained uneventful, while in the second wave 140 (91.5%)

remained uneventful. Regarding the need for readmission for COVID-19, in the first wave 2 (4.1%) needed to return to the hospital, while only 3 (2%) needed care in the second wave. An important finding refers to death without hospitalization, with no cases in the first wave, while in the second wave 10 (6.5%) of the patients died in their homes as a result of COVID-19, these data are summarized as shown in Figure 1.
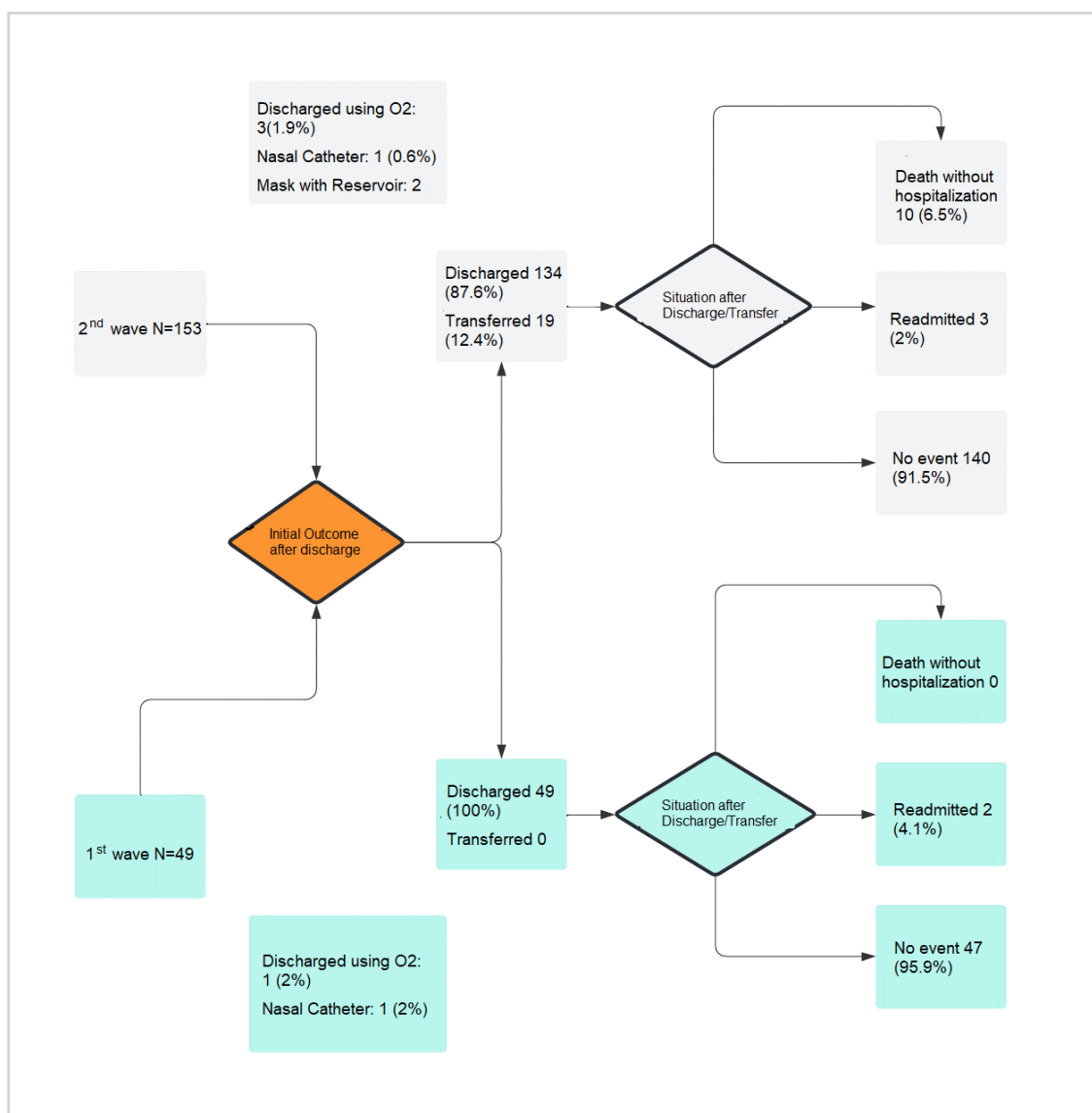

Figure 1 – Flowchart of post-hospitalization data of patients affected by COVID-19 from three hospitals in the State of Ceará, Brazil. 2022

In the investigation of physical symptoms (Graph 1), it is noted that fatigue/tiredness was more prominent in the first wave (n=23, 46.9%) than in the second (n=69, 45.1%), followed by a lack of appetite (n=13, 26.5%), while in the second wave the shortness of breath was highlighted (n=39, 25.5%). Some symptoms such as myalgia, headache, and fever were not reported in the first wave, although in the second wave they were slightly evident with 3 (2%), 5 (3.3%), and 2 (1.3%) individuals, respectively.
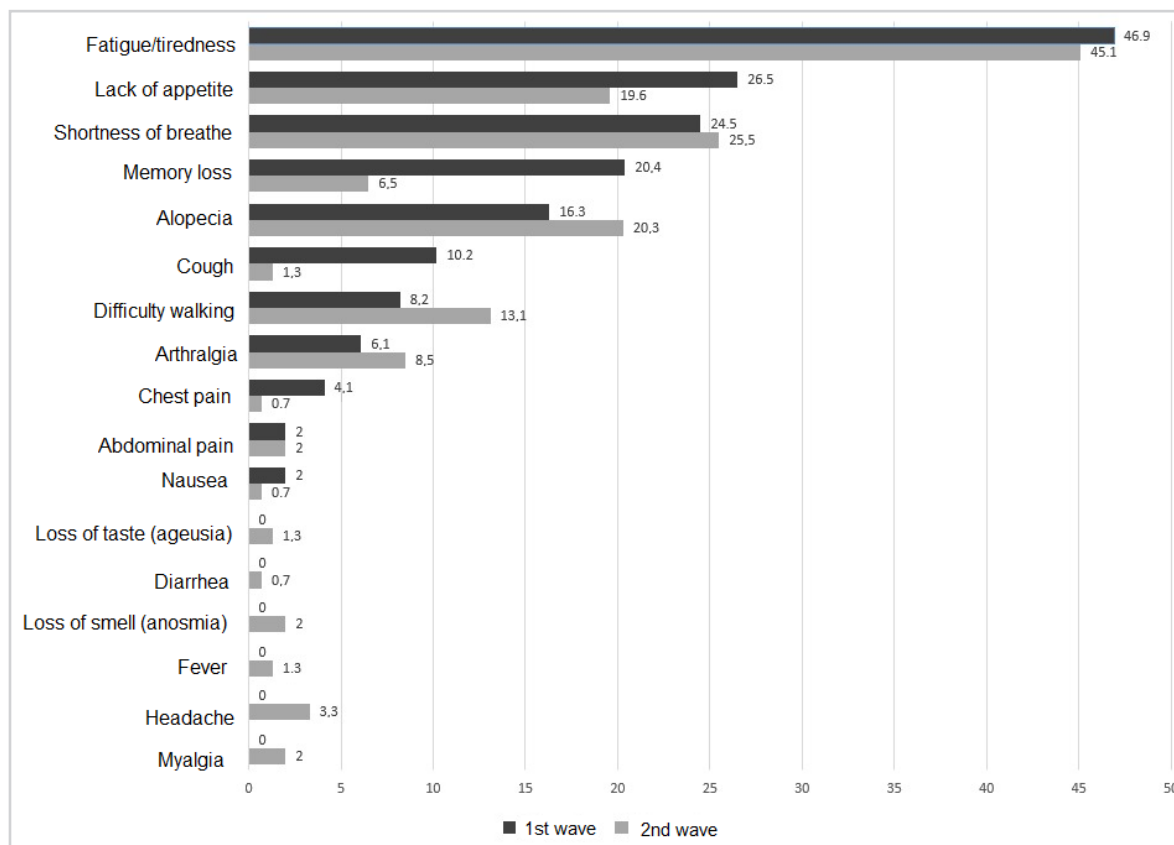

Figure 2 – Percentage distribution of symptoms of discharged patients hospitalized for COVID-19 in three hospitals in the State of Ceará, Brazil. 2022

During the analysis in relation to physical symptoms, an important finding denotes the duration of symptoms involving the study patients. Symptoms such as memory loss, coughing, and chest pain, although not the most prevalent in the first wave, appear to be the most lasting, to the point where patients reported having these symptoms for up to 4 months after hospital discharge. Meanwhile, in the second wave chest pain is mentioned lasting up to 6 months, followed by abdominal pain, diarrhea, and nausea that appear for up to 4 months (Table 2).

Table 2 – Time distribution of symptoms of discharged patients hospitalized for COVID-19 in three hospitals in the State of Ceará, Brazil. 2022.

SYMPTOMS	1st Wave n (49)	Period of highest prevalence	SYMPTOMS	2nd Wave n (153)	Período de maior prevalência
Fatigue/tiredness	23 (46,9%)	up to 3	Fatigue/tiredness	69 (45.1%)	up to 3 months
Lack of appetite	13 (26.5%)	up to 2 months	Shortness of breathe	39 (25.5%)	up to 3 months
Shortness of breathe	12 (24.5%)	up to 2 months	alopecia	31 (20.3%)	up to 3 months
Memory loss	10 (20.4%)	up to 4 months	Lack of appetite	30 (19.6%)	up to 3 months
Alopecia	8 (16.3%)	up to 2 months	Difficulty walking	20 (13.1%)	up to 3 months
Cough	5 (10.2%)	up to 4 months	Arthralgia	13 (8.5%)	up to 3 months
Difficulty walking	4 (8.2%)	up to 3 months	Memory loss	10 (6.5%)	up to 3 months
Arthralgia	3 (6.1%)	up to 3 months	Headache	5 (3.3%)	up to 3 months
Chest pain	2 (4.1%)	up to 4 months	Myalgia	3 (2%)	up to 3 months
Nausea	1 (2%)	up to 1 month	Loss of smell (anosmia)	3 (2%)	up to 3 months
Abdominal pain	1 (2%)	up to 3 months	Abdominal pain	3 (2%)	up to 4 months
Myalgia	-	-	Cough	2 (1.3%)	up to 3 months
Headache	-	-	Fever	2 (1.3%)	up to 2 months
Fever	-	-	Loss of taste (ageusia)	2 (1.3%)	up to 3 months
Loss of smell (anosmia)	-	-	Chest pain	1 (0.7%)	more than 6 months
Diarrhea	-	-	Diarrhea	1 (0.7%)	up to 4 months
Loss of taste (ageusia)	-	-	Nausea	1 (0.7%)	up to 4 months

As for the presentation of psychological symptoms, Figure 3 shows the data from the two waves, which indicates that the symptoms anxiety (first wave 33.8%; second wave 32.7%) and insomnia (first wave 31.8%; second wave 29.8%) were the most mentioned during the interviews.
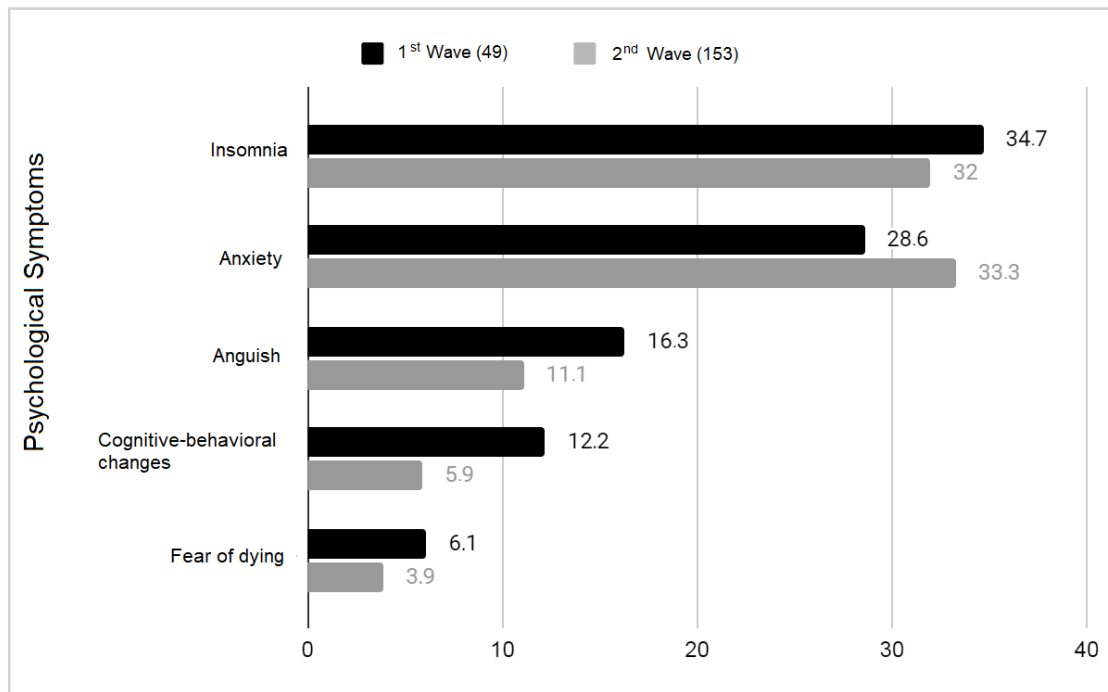
Figure 3 – Percentage distribution of psychological symptoms of discharged patients hospitalized for COVID-19 in three hospitals in the state of Ceará, Brazil. 2022

Regarding the investigation of complications related to COVID-19 in the two waves, those related to pulmonary changes in the first wave recorded 2 (4.1%) individuals, while in the second wave reported 9 (5.9%) individuals. An important finding to highlight is the occurrence of dependence for ADLs, which was not reported in the first wave, but was presented in the second wave with 12 (7.8%) patients. Cardiac alterations were mentioned in both waves with 2 (4.1%) and 4 (2.6%) individuals, respectively.

Table 3 – Complications of symptoms of discharged patients hospitalized for COVID-19 in three hospitals in the State of Ceará, Brazil. 2022

Variables	1st Wave n (49)	2nd Wave n (153)
Pulmonary change	2 (4.1%)	9 (5.9%)
ADL dependency	-	12 (7.8%)
Cardiac change	2 (4.1%)	4 (2.6%)
Neurological change	-	4 (2.6%)
Gastrointestinal change	-	4 (2.6%)
Thrombotic events	-	3 (2%)
Renal change	-	2 (1.3%)

When asked about their general state, the participants performed a self-assessment, a good part of those investigated claimed that their health status remains the same as that observed before the post-COVID-19 experience, both in the first wave (n=45, 91.85%) and in the second (n=140, 91.5%).

DISCUSSION

The current study explored symptomatological remains and their duration in discharged patients hospitalized for COVID-19. In general, symptoms remained on average for 1 to 4 months, with divergent incidences between the first and second waves.

It was observed that there was a higher prevalence of the telephone being answered by third parties, raising the hypothesis of a possible loss of patient autonomy. There are reports from all over the world about patients who, after testing positive for COVID-19 and suffering the acute phase of the disease, are unable to return to their routines, having difficulty performing daily tasks, reflecting the greater need for others for basic activities[10].

Following a trend observed in other national[11] and international[12] studies, this sample was characterized with a more events of COVID-19 among male patients aged 50 years or older, who mostly tend to have more risks and related complications to COVID-19, due to the accumulation of damage and comorbidities that older ages tend to present[13].

Since the beginning of the pandemic, the severity of COVID-19 has been established by its clinical manifestations of pulmonary and systemic interference, the progression of which leads to hospitalization and the need for O2 support. In addition to the severity of the patients, it has been observed that some patients display the persistence of some symptoms even after recovery and hospital discharge, classified according to some authors as Post-COVID-19 Syndrome (PCS); characterized by the continuation of symptoms such as fatigue, dyspnea, and joint pain in a period of up to 60 days, compromising their quality of life[14].

The condition of PCS is determined by the persistence of symptoms for more than four weeks after the initial onset of the disease, including among those who were asymptomatic at this stage. It is generally compared to myalgic encephalomyelitis (ME) and chronic fatigue syndrome (CFS), which arise in the presence of a dysregulation of the immune system[15].

According to a recent study[16], post-hospitalization impairment manifests itself from the persistence of some symptoms to eventual functional impairment, due to inactivity related to the length of hospital stay, the individual's previous health conditions, and the inflammatory burden of the disease.

Post-COVID-19 complications are still being clarified in research around the world, constituting challenges for health systems in the world. In Brazil, efforts by the Unified Health System (UHS) have been essential for the identification of suspected cases, treatment, recovery, and post-COVID-19 care. Without the strategies carried out by the UHS, the proportion of the disease could have spread to more severe proportions in the country[2,3].

In agreement with the results found in the present study, among the most common symptoms are fatigue, weight loss, difficulty concentrating/memory, dyspnea, pain (head, muscle, joint, neural, others), mood changes, and psychological suffering, among others. The authors emphasize that patients who developed the most severe form of the disease are more likely to have some type of chronic pain[15].

According to the study findings, patients in the first wave (2020) had memory loss, coughing, and chest pain as the longest lasting symptoms, persisting for up to 4 months. While in the second wave chest pain appears for 6 months while abdominal pain, diarrhea, and nausea appeared for up to 4 months. A French-language study carried out with 120 patients hospitalized for COVID-19 identified that, on

average, after 110 days of hospitalization, the most frequent persistent symptoms were fatigue (55%), and dyspnea (42%), memory loss (34%), and concentration and sleeping disorders (28% and 30.8%, respectively)[17].

Hair loss was reported by 8 (16.3%) and 31 (20.3%) individuals during the first and second waves, respectively, according to the findings of this study lasting 2 to 3 months. This result converges with the findings of another survey carried out in Wuhan, China with 538 patients with COVID-19 who were followed for 3 months in which they found that alopecia was a more common symptom in women than in men[18]. Comparing to a study with SARS-CoV-1 patients, these findings may be related to factors triggered by the fact that female SARS survivors had higher levels of stress and higher levels of depression and anxiety[19].

Another study sought to describe the clinical evolution and predictors of persistence of symptoms of (COVID-19) in 130 adult patients after 2 months and found that 23% (29) had anosmia/ageusia, 30% (39) dyspnea, and 40% (52) reported asthenia. It was also observed that these persistent symptoms in the second month post-illness were associated with those aged 40 to 60 years old[20].

Physiological changes such as microvascular thrombus, systemic inflammation, and neurotoxicity mediated by inflammatory markers are pointed out as a neuropathological mechanism of COVID-19. The prolonged duration of ICU stays, and prolonged intubation are significantly related to long-term cognitive impairment in COVID-19 patients, further contributing to the loss of autonomy and deconditioning, noting that this post--traumatic stress disorder can progress to post-COVID-19 brain fog[21,22].

According to the findings of a Brazilian study[15], the psychological repercussions resulting from the process of illness, confinement and social self-isolation, and fear added to the socioeconomic changes that involved and continue to involve the pandemic context point to the need for tracking and monitoring psychological suffering in its manifestations such as insomnia, anxiety, depression, dementia, and even suicide itself. Thinking about the psychological phenomena, the findings indicate that even after the end of hospitalization, anxiety and insomnia were still incident in the population.

Studies converge, pointing out that patients recovered from diseases caused by coronavirus may have a persistently increased cardiometabolic demand due to reduced cardiac reserve, use of corticosteroids, and deregulation of the renin-angiotensin-aldosterone system (RAAS)[23,24]. Corroborating the findings of the present study regarding pulmonary and cardiac complications of COVID-19, the literature[25] states that diseases caused by COVID-19 have cardiovascular damage in the acute phase, and cardiac complications also in the post-recovery phase. Among the complications, there are associated myocardial complications, which are classified as: acute ischemic injury (type 1 myocardial infarction), non-ischemic injury (myocarditis), stress cardiomyopathy, heart failure and secondary cardiac injury caused by sepsis, and critical illness[23,26].

One of the limitations of this study is the prudence regarding the generalization of the results, considering that the sample represents a specific population group. The possibility of information bias is also highlighted, given that the provision of information, in most cases, occurred by third parties.

CONCLUSION

As an emerging disease, COVID-19 aroused clinical and research attention concerning its pathophysiology, clinical symptomatology, damage, treatment, and prevention. Two years after the beginning of the pandemic, clinical observers in healthcare are currently expanding investigations into the chronic consequences of SARS-CoV-2, which has been called in the scientific literature as Post-COVID-19 Syndrome.

Therefore, this study shows that the main symptoms reported by the patients in this sample, even after the hospitalization period, were fatigue/tiredness, lack of appetite, dyspnea, memory loss, coughing, and chest pain, which, despite being more prevalent, were not the most lasting symptoms, but rather gastrointestinal disorders (abdominal pain, diarrhea and nausea), anxiety, and insomnia were.

Such evidence points to the imminent need for public strategies for monitoring and intervention services for these patients, paying attention to ensuring the health, functionality, and quality of life of people who have been infected by COVID-19.

Author statement CRediT

Conceptualization: Castro Júnior AR; Moreira FJF; Abreu LDP. Methodology: Castro Júnior AR; Moreira FJF; Abreu LDP. Validation: Castro Júnior AR; Moreira FJF; Abreu LDP. Statistical analysis: Castro Júnior AR; Gomes TF; Martins MIS; Santos MAP; Paiva AI. Formal analysis: Castro Júnior AR; Gomes TF; Martins MIS; Santos MAP; Paiva AI. Research: Castro Júnior AR; Gomes TF; Martins MIS; Santos MAP; Paiva AI. Resources: Moreira FJF. Elaboration of original writing: Castro Júnior AR; Moreira FJF; Abreu LDP. Writing-review and editing: Castro Júnior AR; Gomes TF; Martins MIS; Santos MAP; Paiva IA; Moreira FJF; Abreu LDP. Visualization: Castro Júnior AR; Gomes TF; Martins MIS; Santos MAP; Paiva IA; Moreira FJF; Abreu LDP. Supervision: Moreira FJF; Castro Junior AR. Project administration: Moreira FJF; Castro Junior AR.

All authors read and agreed with the published version of the manuscript.

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