

Functional Capacity and Self-Care in Post-COVID-19 Patients in a Recovery Program*

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✉ **Amanda Regina da Silva Góis**

<https://orcid.org/0000-0003-4661-772X>
Universidade de Pernambuco, Brazil
amanda.gois@upe.br

Taiane Silva Rodrigues

<https://orcid.org/0009-0003-2670-4743>
Universidade de Pernambuco, Brazil
taiane.rodrigues@upe.br

Roxana Braga de Andrade Teles

<https://orcid.org/0000-0001-9486-5109>
Universidade de Pernambuco, Brazil
roxana.braga@upe.br

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Theme: Self-care, well-being and rehabilitation.

Contributions to the discipline: This study contributes to the development of health education and care strategies aimed at rehabilitation by assessing functional capacity and self-care in post-COVID-19 patients in the light of the theory of self-care and self-care deficit, developed by Dorothea Orem.

Abstract

Introduction: COVID-19 manifests with acute symptoms. After coronavirus infection, they may persist or new ones may emerge, compromising functional capacity and self-care. This condition has been named “acute post-COVID-19 syndrome”. **Objective:** To evaluate functional capacity and self-care in post-COVID-19 patients. **Materials and methods:** This is a descriptive and exploratory study, which evaluated 53 medical records of patients receiving care in a Functional Recovery Program for acute post-COVID-19 syndrome, conducted at a public university, from August 2022 to August 2023. A descriptive and association analysis was performed using Pearson’s Chi-squared or Fisher’s exact nonparametric tests, with a significance level of 5% ($p < 0.05$). **Results:** Most participants were female, aged over 50 and receiving home care during the infection. Associations were found between the length of hospitalization ($p = 0.03$), having a history of surgery ($p = 0.01$), and a medium self-care capacity ($p = 0.04$) with the functional capacity to perform instrumental activities of daily living (IADL). **Conclusion:** Post-COVID-19 syndrome is associated with medium self-care capacity and partial dependence in terms of IADLs. The finding contributes to the development of health education and care strategies aimed at providing recovery.

Keywords (Source: DeCS)

Post-acute COVID-19 syndrome; self-care; activities of daily living; rehabilitation; health education; Nursing.

4 Capacidad funcional y autocuidado en pacientes post-covid-19 en un programa de rehabilitación*

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Resumen

Introducción: la COVID-19 se manifiesta con síntomas agudos. Tras la infección por coronavirus, estos pueden persistir o pueden aparecer otros nuevos, comprometiendo la capacidad funcional y el autocuidado. Esta condición se ha denominado “síndrome Post COVID-19 agudo”. **Objetivo:** evaluar la capacidad funcional y el autocuidado en pacientes post COVID-19. **Materiales y método:** se trata de un estudio descriptivo y exploratorio, en el que se evaluaron 53 historias clínicas de pacientes atendidos en un Programa de Rehabilitación Funcional para el Síndrome Post COVID-19 Agudo, desarrollado en una universidad pública, desde agosto de 2022 hasta agosto de 2023. Se realizó análisis descriptivo y de asociación mediante las pruebas no paramétricas chi-cuadrado de Pearson o exacto de Fisher, con un nivel de significación del 5 % ($p < 0,05$). **Resultados:** la mayoría eran mujeres, mayores de 50 años y tratadas en su domicilio durante la infección. Se encontraron asociaciones entre el tiempo de hospitalización ($p = 0,03$), el antecedente de cirugía ($p = 0,01$) y la capacidad mediana de autocuidado ($p = 0,04$) con la capacidad funcional para realizar actividades instrumentales de la vida diaria (AIVD). **Conclusiones:** el síndrome post-covid-19 agudo se asocia con capacidad mediana de autocuidado y dependencia parcial para las AIVD. El hallazgo aporta al desarrollo de estrategias de educación para la salud y cuidados orientados a la rehabilitación.

Palabras clave (DeCS)

Síndrome post-covid-19 agudo; autocuidado; actividades de la vida diaria; rehabilitación; educación sanitaria; enfermería.

Capacidade funcional e autocuidado em pacientes pós-covid-19 em um programa de reabilitação*

* Este artigo está vinculado ao projeto intitulado “Tecnologias educacionais cuidativas e intervenções voltadas à promoção da saúde e reabilitação no contexto pós covid-19”, financiado pela Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco, código de financiamento/processo APQ-1251-4.04/21.

Resumo

Introdução: a covid-19 se manifesta com sintomas agudos. Após a infecção pelo coronavírus, eles podem persistir ou novos podem surgir, comprometendo a capacidade funcional e o autocuidado. Essa condição foi chamada “síndrome pós-covid-19 aguda”. **Objetivo:** avaliar a capacidade funcional e o autocuidado em pacientes pós-covid-19. **Materiais e método:** trata-se de um estudo descritivo e exploratório, que avaliou 53 prontuários de pacientes atendidos em um Programa de Reabilitação Funcional da síndrome pós-covid-19 aguda, desenvolvido em uma universidade pública, de agosto de 2022 a agosto de 2023. Procedeu-se à análise descritiva e de associação com testes não paramétricos Qui-quadrado de Pearson ou exato de Fisher, com nível de significância de 5 % ($p < 0,05$). **Resultado:** a maioria era do sexo feminino, maiores de 50 anos com tratamento domiciliar durante a infecção. Foram encontradas associações entre tempo de internamento ($p = 0,03$), história de cirurgias ($p = 0,01$) e média capacidade para o autocuidado ($p = 0,04$) com a capacidade funcional para realizar as atividades instrumentais de vida diária (AIVD). **Conclusões:** a síndrome pós-covid-19 está associada à média capacidade de autocuidado e dependência parcial para AIVD. O achado contribui para a elaboração de estratégias de educação em saúde e cuidado voltado à reabilitação.

Palavras-chave (Fonte DeCS)

Síndrome de covid-19 pós-aguda; autocuidado; atividades cotidianas; reabilitação; educação em saúde; enfermagem.

Introduction

Coronavirus disease (COVID-19) was recognized by the World Health Organization (WHO) on March 11, 2020, as a pandemic disease related to Sars-CoV-2, capable of causing mild flu-like symptoms to systemic disorders and death (1, 2).

During the pandemic, it was found that some patients remained affected by the disease even several weeks after the onset of symptoms. This condition has been named in a variety of ways, such as “long COVID-19”, “post-COVID-19”, “post-acute COVID-19” or “acute post-COVID-19 syndrome” (3). Subsequently, it was found that the symptoms observed in some patients were similar to those presented during the acute phase of the infection. However, new symptoms reported by patients were identified which were not associated with other pre-existing diseases or comorbidities. These new symptoms had a significant impact on the health and functional capacity of the affected individuals, compromising their daily activities (4, 5).

As a result, studies have started reporting symptoms that are frequently present in the population with the acute post-COVID-19 syndrome condition, including fatigue, headache, memory loss, and arthralgia. These symptoms compromise the quality of life and well-being of individuals, resulting in a significant deficit in self-care and a loss of functional capacity (6).

The concept of self-care, according to Dorothea Orem’s self-care theory, refers to the maintenance of health and the prevention of complications. In contrast, the self-care deficit theory is related to the demands for therapeutic care, considering that an individual may not have sufficient skills to meet these demands and may need assistance from others. Both theories are used to evaluate the level of impairment or self-care capacity of individuals (7).

In this context, the present study is based on the hypothesis that the evaluation of functional capacity and self-care can identify impairments that impact the well-being and quality of life of post-COVID-19 patients. Furthermore, it is suggested that, given the identification of these parameters, it is necessary to develop specific health education and strategies for recovery. Therefore, the objective was to evaluate functional capacity and self-care in post-COVID-19 patients.

Materials and methods

This is a quantitative, descriptive-exploratory study conducted with patients receiving care in an acute post-COVID-19 Syndrome Functional Recovery Program at a public university located in the city of Petrolina, Pernambuco, Brazil, from August 2022 to August 2023. The preparation of this article followed the guidelines of the Consolidated Standards of Reporting Trials [Consort] (8).

The study population includes all patient records, totaling 71 individuals. However, 18 records were excluded due to incomplete data required for analysis. Thus, the final sample consisted of 53 medical records of participants of both sexes, aged over 18, who self-reported a confirmed clinical diagnosis of COVID-19 and presented a condition compatible with acute post-COVID-19 syndrome, according to the initial evaluation performed by the interdisciplinary team.

The data were collected using an instrument developed by the authors, which included the following variables: identification (sex, age, and race), initial signs and symptoms of COVID-19 and post-COVID-19, main complaint, lifestyle habits (use of tobacco, alcohol, and/or other drugs), sociocultural or economic conditions (education, religion, marital status, family relationships), and health conditions (pre-existing illnesses, family history of illnesses), vital signs, and anthropometric measurements.

In addition, the self-care ability score was evaluated using the Appraisal of Self-Care Agency Scale [ASA-A] (9), consisting of 24 questions with five alternative answers (1 – totally disagree; 2 – disagree; 3 – neither agree nor disagree; 4 – agree; 5 – totally agree). The scale classifies self-care capacity as high (97-120 points), medium, (49-96 points) or low (24-48 points).

Furthermore, functional capacity was assessed using the instrumental activities of daily living [IADL] assessment tool (10), which covers seven components, namely: phone, travel, shopping, meal preparation, housework, medication, and money, each with three answer options, classed as dependent (7 points), independent (21 points), and partially dependent (8-20 points).

The data was coded into Microsoft Office Excel® spreadsheets and then transferred to the Statistical Package for the Social Sciences (SPSS) software, version 22.0, for analysis. Descriptive analyses were performed using frequency distribution, central tendency, and dispersion measurements. To calculate the statistical significance of the associations, nonparametric tests such as Pearson's Chi-squared or Fisher's exact were conducted, with a significance level set at 5 % ($p < 0.05$) to identify possible associations.

The study was approved by the Research Ethics Committee of the Centro Integrado de Saúde (Integrated Health Center) Amaury de Medeiros, at the Universidade de Pernambuco, under protocol number 4.728.269, respecting all ethical precepts.

Results

Most of the sample consisted of female individuals (86.8 %), aged 50 or over (47.2 %), of mixed race (62.3 %), and married (45.3 %). In terms of their level of education, 49.1 % had completed high

school. More than half of the sample followed the Catholic faith (52.8 %) and 41.5 % reported a family income of more than 1.5 times the national minimum wage. Most participants were residents of the city of Petrolina, Pernambuco (92.5 %).

Regarding hospitalization, 15.1 % of the sample reported having been admitted to an intensive care unit (ICU), with a mean length of stay of 30.5 days with a standard deviation of ± 19.19 or had been admitted to a ward for 13.2 days with a standard deviation of ± 22.36 days (Table 1).

Table 1. Length of Patient Stay in ICUs and Wards. Petrolina, Pernambuco, Brazil, 2022-2023

Variables	Mean (SD)	Standard Deviation
Length of ICU stay (days)	30.5	19.19
Length of stay in a ward (days)	13.2	22.36

Source: Elaborated by the authors.

Only 5.7 % were smokers and 34 % used alcoholic beverages; 62.3 % reported having a pre-existing condition and 37.7 % of the patients had a body mass index above 30, classifying them as obese. The signs and symptoms were categorized according to the system affected. In the respiratory system, the most frequently reported symptoms included coughing, dyspnea, fatigue, coryza, and flu-like symptoms. In the musculoskeletal system, the prevalent symptoms were fatigue, muscle pain, and arthralgia. Regarding the central nervous system, the main symptoms found were changes in memory, lack of concentration, mental confusion, headaches, and sleep disturbances.

Regarding the symptoms presented during the acute and post-acute stages of COVID-19, more than half of the participants (54.7 %) reported symptoms involving three or more systems, while 18.9 % reported simultaneous symptoms in the musculoskeletal and central nervous systems during the infection. In the post-acute stage, a similar pattern was found, with 37.7 % of patients reporting symptoms in three or more systems and 18.9 % presenting symptoms in the musculoskeletal and central nervous systems.

In the physical evaluation, vital signs such as respiratory rate, heart rate, systolic and diastolic blood pressure, oxygen saturation, and axillary temperature were within normal standards. It was possible to identify an association ($p < 0.05$) between self-care capacity, length of hospitalization, and whether the patient had already undergone surgery regarding the level of dependence in terms of performing instrumental activities of daily living.

Table 2. Association of IADL according to Sociodemographic, Clinical, and Behavioral Characteristics and Self-Care Ability. Petrolina, Pernambuco, Brazil, 2022-2023

IADL	Independent	Partially Dependent	
Variables	n (%)	n (%)	p-value
Sex			
Male	2 (28.6)	5 (71.4)	0.11**
Female	29 (63)	17 (37)	
Age			
From 18-29 years	9 (69.2)	4 (30.8)	0.52*
From 30-39 years	5 (55.6)	4 (44.4)	
From 40-49 years	2 (33.3)	4 (66.7)	
Aged 50 or over	15 (60)	10 (40)	
Hospitalization			
Yes	2 (25)	6 (75)	0.03*
No	29 (64.4)	16 (35.6)	
Symptoms During Infection			
Asymptomatic	1 (100)	0 (0)	0.49*
MSS	1 (100)	0 (0)	
CNS	1 (100)	0 (0)	
RS	1 (50)	1 (50)	
MSS+CNS	6 (60)	4 (40)	
MSS+RS	2 (66.7)	1 (33.3)	
CNS+RS	0 (0)	3 (100)	
3 or more systems	16 (55.2)	13 (44.8)	
Current Symptoms (after Clinical Cure)			
MSS	2 (33.3)	4 (66.7)	0.39*
CNS	4 (66.7)	2 (33.3)	
MSS+CNS	5 (50)	5 (50)	
MSS+RS	3 (100)	0 (0)	
CNS+RS	4 (80)	1 (20)	
3 or more systems	12 (60)	8 (40)	
Pre-existing Medical Condition			
Yes	17 (51.5)	16 (48.5)	0.06*
No	12 (80)	3 (20)	
Which Condition?			
CNCD	12 (52.2)	11 (47.8)	0.56*
Respiratory diseases	1 (100)	0 (0)	
Heart diseases	0 (0)	1 (100)	
2 or more	4 (50)	4 (50)	

IADL	Independent	Partially Dependent	
Variables	n (%)	n (%)	p-value
Other conditions?			
Yes	7 (53.8)	6 (46.2)	0.58*
No	17 (63)	10 (37)	
Do you use any medication?			
Yes	25 (59.5)	17 (40.5)	0.51**
No	6 (54.5)	5 (45.5)	
Previously undergone surgery			
Yes	17 (47.2)	19 (52.8)	0.01*
No	14 (82.4)	3 (17.6)	
Family History of a Condition			
CNCD	21 (55.3)	17 (44.7)	0.40*
Heart diseases	2 (100)	0 (0)	
2 or more	6 (66.7)	3 (33.3)	
ASA-A			
High self-care capacity	17 (73.9)	6 (26.1)	0.04*
Medium self-care capacity	14 (46.7)	16 (53.3)	

Source: Elaborated by the authors.

*Chi-squared test; **Fisher's exact test; MSS – musculoskeletal system; CNS – central nervous system; RS – respiratory system; CNCD – chronic non-communicable diseases.

Regarding ASA-A, which evaluates self-care capacity, approximately 56.6 % of the sample showed medium self-care capacity. Regarding functional capacity to perform IADL, 53.3 % also were partially dependent –i.e., having medium self-care capacity, which implies dependence to perform IADL.

Discussion

Among the study's findings, it is worth discussing the association between IADL and sociodemographic, clinical, and behavioral characteristics as well as self-care capacity. Firstly, it is relevant to mention that some studies indicate that post-COVID-19 syndrome develops more markedly in individuals who have presented severe forms of the disease in the acute stage. However, other studies have shown the presence of this condition even in patients who have manifested mild forms of the disease (10-12).

In the present study, it was found that acute post-COVID syndrome can exhibit a range of signs and symptoms, regardless of age, gender, the presence or absence of comorbidities, or the level of severity of the initial onset of COVID-19, corroborating the findings of the aforementioned studies (10-12).

Being able to perform instrumental activities of daily living is directly related to self-care and quality of life. These activities are associated with preserving a life in the community, including tasks such as shopping, using the phone, traveling, managing money, doing household chores, and preparing meals. These activities are essential for individuals' autonomy and, consequently, for their integration and functionality in society. The ability to perform IADL is a crucial indicator of the level of independence and well-being of patients, especially those who have recovered from COVID-19 (13).

In this sense, one study (14) found that a small proportion of post-COVID patients presented impaired functional capacity even six months after the onset of symptoms, and this functional loss may be even greater among patients who had muscle or joint pain at the onset.

Functional capacity is related to physical fitness, enabling individuals to perform their daily activities independently, mainly with the objective of self-care, health and, consequently, quality of life. Another study (6) shows that COVID-19 affects the functionality of patients, leading to prolonged sequelae that impair their IADL.

A recent study (14) found that almost 60 % of Brazilians who had COVID-19 developed the post-COVID-19 condition. Fatigue, anxiety, memory loss, and hair loss were the most commonly mentioned symptoms, but more than 50 symptoms were mentioned and grouped into 10 categories, including cardiovascular/coagulation, dermatological, endocrine-metabolic, gastrointestinal, musculoskeletal, renal, respiratory, neurological, and mental health-related symptoms, as well as general symptoms such as pain and dizziness.

According to the WHO estimates (15, 16), between 10 % and 20 % of patients—corresponding to between 2.8 million and 5.6 million Brazilians—may suffer from acute post-COVID-19 syndrome and, as a result, will need healthcare due to the condition. When relating the symptoms to the Sars-CoV-2 virus variants, it can be noted that the original strain has as common symptoms fevers, dry cough, tiredness, and loss of taste or smell. For the omicron variant, frequent symptoms include extreme tiredness, body pain, headache, and sore throat. In the delta variant, the prevailing symptoms are coryza, headache, sneezing, sore throat, persistent coughing, and fever. The gamma variant has symptoms such as fever, coughing, sore throat, shortness of breath, diarrhea, vomiting, body pain, tiredness, and fatigue. For the alpha variant, the common symptoms are loss or alteration of smell, loss or alteration of taste, fever, persistent coughing, chills, loss of appetite, and muscle pain. Finally, in the beta variant, the most common symptoms are fever, coughing, sore throat, shortness of breath, diarrhea, vomiting, body pain, tiredness, and fatigue (16, 17).

Another relevant finding refers to the prevalence of women aged 50 and over, which can be explained by the increased demand for healthcare services by this age group. Women seek healthcare services more than men in any age group (18). Other authors (5) conducted a study with a sample of 221 patients who had COVID-19 and found that women were the most affected (63.8%), with a mean age of 43.6 years, 56.6 % were of mixed race and 55.7 % were married, with a higher risk of low levels of functional capacity and general state of health. The study points to greater social pressure, new roles assumed by women during the pandemic, and increased emotional overload as possible causes.

Regarding monthly family income, some studies show that care and demand for healthcare services are higher among the most vulnerable population or those with a monthly income ranging from one to two times the minimum wage in Brazil (17-19). Regarding religion and skin color, the sample is in line with the national reality, in which data from a survey conducted in 2022 by the Instituto Brasileiro de Geografia e Estatísticas (Brazilian Institute of Geography and Statistics) [IBGE] (20) showed that 45.3 % of Brazilians declare themselves to be of mixed race, which demonstrates a significant increase in the mixed-race population since 2017; in turn, self-declared white people represent 42.8 % of the population. In addition, data from the 2010 IBGE census (21) reported that approximately 64.63 % of Brazilians are Catholics, corroborating the sample studied; no information on religion was found in the most recent census.

It was also possible to find an association between hospitalization and partial dependence to perform IADL. A study conducted in 2019 reported that hospitalization can interfere with a person's autonomy and independence since hospitalization itself is already a factor that leads to dependence (22). Another study conducted in 2018 found that, regardless of the cause of hospitalization, approximately 41.6 % of the sample showed a decline in patients' autonomy and independence compared to the period prior to hospitalization. In addition, an association was found between a previous history of surgery and partial dependence on performing IADL. This finding may be related to the delay or cancellation of elective surgeries during the pandemic, in which prolonged waiting for these procedures may lead to the need for more complex surgeries or multiple interventions. In addition, surgeries can compromise functional capacity in some respects in the long term.

A study conducted to evaluate the quality of life one year after trans-trochanteric femoral surgery showed that, when comparing the values assigned to basic activities of daily living (BADL) and IADL in the preoperative stage and one year after surgery, there was a higher level of functional dependence one year after surgery. The IADL was significantly worse in more than 50 % of cases. The study also emphasizes that the use of treatments that enable an early recovery should be the goal of the surgical team to minimize the negative impact on patients' functional capacity and self-care (24-26).

Another study shows that the persistence of post-COVID-19 syndrome symptoms is indicative of a deteriorating quality of life, with an impact on the physical and mental health of those affected, reducing their functional status, limiting their activities, and hindering self-care (26). The data provides a better understanding of the impact that post-COVID-19 syndrome has on the performance of activities and the impact on quality of life.

In this sense, one study shows that the rate of self-care autonomy decreased for those who were already considered partially dependent approximately three months after infection. In patients who considered themselves independent in terms of daily activities and self-care, dependence was also evaluated and increased from 6 % before the infection to 41 % after it. In other words, both individuals who already had impaired functional capacity and self-care and those who were independent suffered changes three months after infection by the virus (27).

Some authors emphasize the need for longer post-COVID-19 functional monitoring to provide complete care for these patients, given that if there is a loss of functional capacity, patients' mobility, self-care, usual activities, comfort, and mental health will also be impaired, resulting in a reduced quality of life (11).

Thus, patients affected by Sars-CoV-2 need support for their recovery, both in the acute and post-acute stages, and this recovery process should be performed by a multidisciplinary and multiprofessional team, considering the specificities of each individual, carefully analyzing their symptoms and comorbidities or disabilities (28).

The study's limitations stem mainly from the sample size, which was influenced by the epidemiological context and the collection site, which was considered distant by participants with mobility deficits and limited financial resources to cover the commuting costs. Another limitation was the fact that most studies on IADL are associated with the elderly; few studies have been developed and published on IADL among young adults.

Conclusion

The study enabled the evaluation of the functional capacity and self-care in post-COVID-19 patients, allowing the profile of the affected patients to be identified. Most were female, aged over 50, and receiving home care during the acute infection. Associations were found between the length of hospitalization, having a history of surgery, and a medium self-care capacity with the functional capacity to perform IADL.

Thus, acute post-COVID-19 syndrome is associated with a medium self-care capacity and partial dependence in terms of IADL in

the study participants. The finding contributes to the development of health education and care strategies aimed at recovery, allowing for care planning and personalized assistance in the procedures and interventions that must be performed for effective recovery.

It is considered that, even with the end of the acute stage of the pandemic, its implications for the functional capacity and self-care of those affected need to be further investigated.

Conflict of interest: None declared.

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