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REVIEW

Clinical relationships of Post-COVID-19 syndrome with Post-Intensive Care Syndrome: a scope review

Relações clínicas da síndrome pós-COVID-19 com a síndrome pós-cuidados intensivos: uma revisão de escopo

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ABSTRACT

Objective: To map the clinical relationships of Post-COVID-19 syndrome with post-intensive care syndrome. **Method:** This is a scope review, directed by the recommendations of the Joanna Briggs Institute and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews for the organization of the study. **Results:** After the final selection of 14 studies, the main clinical relationships of Post-COVID-19 Syndrome were distributed in view of the alterations of the Post-Intensive Care Syndrome, the main ones being dyspnea, fatigue, dysphagia, pain, depression, weakness, insomnia and stress. **Conclusion:** It was possible to explain the main clinical relationships, making it feasible to clarify the conditions that the carrier of the syndromes may present. The continuity of research in this area is relevant, especially in nursing.
Keywords: Nursing; COVID-19; Critical Care.

RESUMO

Objetivo: Mapear as relações clínicas da Síndrome Pós-COVID-19 com a Síndrome Pós-Cuidados Intensivos. **Método:** Trata-se de uma revisão de escopo, direcionada pelas recomendações do Instituto Joanna Briggs e do *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* para organização do estudo. **Resultados:** Após seleção final de 14 estudos, as principais relações clínicas da Síndrome Pós-COVID-19 foram distribuídas diante das alterações da Síndrome Pós-cuidados Intensivos, sendo as principais: dispneia, fadiga, disfagia, dor, depressão, fraqueza, insônia e estresse. **Conclusão:** Foi possível explanar as principais relações clínicas, tornando viável o esclarecimento das condições que o portador das síndromes possa apresentar. Sendo relevante a continuidade de pesquisas nesta área, principalmente na Enfermagem.
Descritores: Enfermagem; COVID-19; Cuidados Críticos.

INTRODUCTION

In March 2020, the World Health Organization (WHO) declared a pandemic due to the worldwide spread of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), responsible for the contamination of more than 229 million people worldwide, from which more than 4.7 million evolved to death, and thousands more needed hospital care in Intensive Care Units (ICUs), due to the need for advanced health support and care from specialized professionals, which are organized according to age group care age in adult, pediatric and neonatal ICUs[1].

During hospitalization in the adult ICU, several patients who needed specialized care presented complications related to the viral disease, such as: prolonged and disseminated hypercoagulation, psychomotor and disabling factors related to cerebrovascular accidents (CVA)[2], acute and chronic kidney disease, Acute Coronary Syndrome and myocardial infarction and severe hypoxia[3,4].

In addition to complications resulting from the ICU hospitalization, there are more than 50 symptoms that may arise after discharge related to SARS-CoV-2 infection, including: fatigue, dyspnea, cough, muscle dysfunction, joint pain,

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lack of cardiorespiratory conditioning, postural instability, chronic headache, tachycardia and chest pain[5,6].

In 2021, the WHO defined this set of symptoms associated with COVID-19 as the Post-COVID-19 Syndrome, where individuals with a history of SARS-CoV-2 infection, suspected or confirmed, after three months, presented clinical indicators that lasted for months, which could not be explained by an alternative diagnosis[1]. Consequently, the propensity for multiple organ failure is a reality of Post-COVID-19 Syndrome.

With regard to organ failure and changes arising from ICU admissions, the Society of Critical Care, in 2012, defined the term Post-Intensive Care Syndrome (PICS) or Post Intensive Care Syndrome (PICS), as the presence of new or progressive limitations in the physical, cognitive or psychiatric state of health that start from the acute illness and persist beyond hospitalization[7,8].

Aligned with the complexity of these two syndromes and the context of the patient who is diagnosed with COVID-19 and requires care in the ICU, the development of research that provides an improvement in the quality of life after the hospitalization period is necessary. Aiming at ordering the comprehensive care by multidisciplinary teams at medium and low complexity levels, strengthening the direction of goals, with a design for these individuals[8].

In addition, in view of the health crisis, the search for scientific evidence is emerging to support the care for patients with these two syndromes treated in health services. In view of the above, the following guiding question was defined: What are the productions of knowledge in the literature regarding the clinical relationships of Post-COVID-19 Syndrome with Post-Intensive Care Syndrome?

In view of this theme and contextualization, this study aims to map the clinical relationships of post-COVID-19 Syndrome with Post-Intensive Care Syndrome.

METHOD

In view of the outlined objective, the scoping review method was used, which is characterized by mapping the main concepts, extensions, scope and nature of a given concept, as well as synthesizing the data of the referred investigation and the existing gaps in the literature about the object of study[10].

As a reference, the five recommended steps follow the recommendations of the JBI[11], as well as the items recommended in the checklist PRISMA Extension for Scoping Reviews (PRISMA-ScR)[12] in order to organize the essay. In addition, the Rayyan software, an online and free technological tool, was used to organize the articles after cross matching the databases[13].

For the construction of the research question, the PCC mnemonic was used: (P) - Population: individuals who, after infection with SARS-Cov-2, developed clinical indicators of the Post-COVID-19 Syndrome; (C) – Concept: clinical relationships of Post-COVID-19 Syndrome with PICS; and (C) – Context: Intensive care unit. With regard to the collection of studies, this research took place in three stages, from March to early April 2022:

Step A: initial search in the International Prospective Register of Systematic Reviews (PROSPERO), Open Science Framework (OSF), The Cochrane Library, JBI Clinical Online Network of Evidence for Care and Therapeutics (CONNECT+) and Database of Abstracts of Reviews of Effects (DARE), in order to find research with a similar scope, but without results with the theme.

Step B: The research was registered in the OSF (https://osf.io/b2c5x/). The descriptors were defined in the Medical Subject Headings (MeSH): 1. Post-intensive care syndrome; 2. COVID-19 post-intensive care syndrome; and 3. post-acute COVID-19 syndrome. The search strategy, in view of the theme, was carried out as follows with the addition of the Boolean operators "AND" and "OR": "COVID-19 post-intensive care syndrome" OR "post-acute COVID-19 syndrome" AND "post-tintensive care syndrome".

Step C: after selecting the cross matchings, the search was carried out in the following databases: PubMed, CINAHL, Web of Science, Scopus, CAPES Portal of Theses and Dissertations, DART-Europe E-Theses Portal, Open Access Scientific Repository of Portugal (RCAAP), National ETD Portal and Theses Canada, with data collection being carried out in pairs, independently and blinded, by two master researchers. With the aid of the CAfe platform (Federated Academic Community), inserted in the CAPES Periodicals Portal.

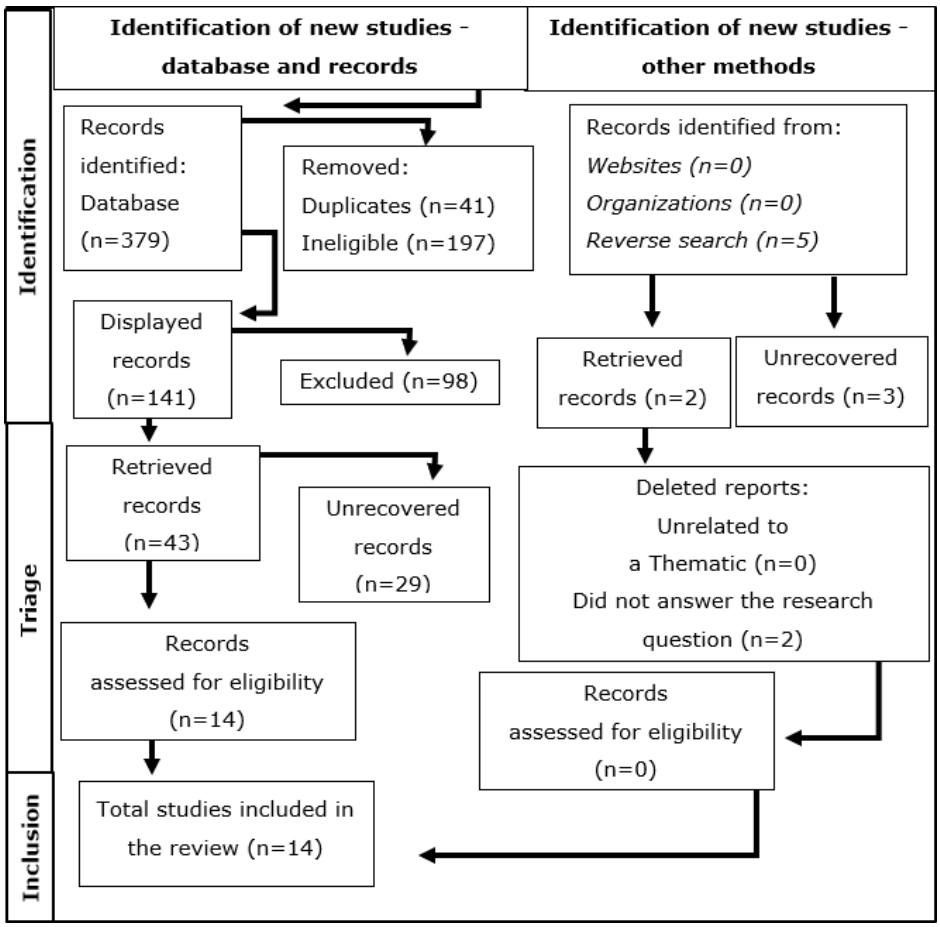
Regarding inclusion criteria, studies published in full were selected, without distinction of languages and with temporal delimitation after January 2020. This choice is justified taking into account the period of emergence and identification of infection in humans by SARS- Cov-2. Exclusion criterion included productions that did not respond to the research question.

The studies were selected after a previous rea-

ding of the title and abstract and selected for reading in full depending on their adequacy regarding the inclusion/exclusion criteria and answer to the guiding question. It is noteworthy that the studies were classified according to the categorization of the Oxford Center for Evidence--based Medicine, which establishes the level of evidence and the degree of recommendation[11].
The studies were extracted using Figure 1, which demonstrates the PRISMA-ScR flow diagram, and were presented through the formation of a table presented in the results of this research.
This study followed the precepts of Law nº 9.610/98, which supports the preservation and respect of ideas, concepts and definitions of selected primary studies[14].

RESULTS

At the end of the analysis, the sample consisted of 14 studies published between the years 2020, with two publications (14.2%), 2021 with 11 publications (78.5%) and 2022 with one publication (7.1%) with a predominance of publications at an international level (93.7%) as shown in the flowchart in Figure 1.
With regard to the type of study and methodological quality, based on the levels of evidence[11], with the aid of the Rayyan software (13), seven (50%) were observational studies, five (36%) were literature reviews and two (14.2%) case reports, according to the Oxford Center for Evidence-Based Medicine.
Among the selected productions, only one was published by the area of concentration in Nursing (7.1%), but the overall necessary interventions for the patient in question were not specifically addressed (Figure 2).
The selection of symptoms that appear in Figure 2 was based on the clinical indicators of the Post-COVID-19 Syndrome, the articles analyzed and the signs and symptoms that the patients presented and were described in the studies



Source: Prepared by the authors, 2022.
Figure 1 - PRISMA-ScR flow diagram showing the search for selection of results. Natal, RN, Brazil, 2022

being extracted and that were adequate to the clinical signs of the syndrome. In which the most cited by the previously listed studies were fatigue[15,19,25-27] and dysphagia[15,16,18,21,27] listed in five studies (35.7%); depression[20,22,23,25] in four studies (28.5%); insomnia[22,23,25]) and stress[20,22,23] appear in three (21.4%) and two studies (14.2%) joint, muscle and intrascapular pain[19,26] and weakness[15,28]. In Figure 3, the main relationships with PICS are presented.

DISCUSSION

The findings of this review outline important relationships between the clinical indicators that make up the Post-COVID Syndrome and PICS, as described in the results. It is possible that the passage of the individual through the ICU and the involvement of COVID-19 cause complex physical, psychological and cognitive changes, as demonstrated by the tracking of these changes in the literature[15-20, 28-29].

According to Carfì et al.[19], the persistence of symptoms linked to these individuals would be related to worsening after infection and respective hospitalization, mainly in the ICU. The ICU environment and the isolation of the viral disease can corroborate the cognitive and psychological changes observed in PICS.

With criticality and regular hospitalizations, patients with long-term COVID-19 require attention to the changes they may manifest. This observation occurs in patients after ICU admission who underwent invasive treatment and with the triggering of generalized organic dysfunctions resulting from a critical illness[17].

Corroborating this scenario, research carried out in Italy, with 143 patients followed up after acute treatment for COVID-19, observed that the length of hospital stay (≅ 13.5 days) and support in oxygen therapy had repercussions on the development of persistent symptomatology in 87% of subjects. Of these, approximately 44.1% had worse quality of life after 6 months of discharge, linked to respiratory (42.0%), systemic (36.1%), neurological (20.8%), mental health changes (12.2%) and infections (7.9%)[22]. This demonstrates the relationship of changes present in PICS in Post-COVID individuals, addressing the relationship of symptoms present in this study.

Continuing with concerns involving PICS in COVID-19 survivors, in an observational study carried out in Spain with 969 patients, the high prevalence of cognitive and psychological disorders was highlighted, with post-traumatic stress disorder (39%), depression (33%) and anxiety (30%) being the most evident[25]. Compacting the relationships found in this study between the Post-COVID-19 Syndrome and PICS.

The quality of life and daily activities are impaired due to the joint changes of the syndromes and the survival prognosis of this individual. As demonstrated by the prospective cohort study carried out in southern Brazil, with follow-up of 162 patients with a mean age of 55±17 years, 50% had cognitive dysfunction, 64% had symptoms of depression and 52% had symptoms of anxiety. Impacting this patient's organic rehabilitation response and how he will face his new life condition[33].

Considering the post-discharge follow-up, as they are considered serious and have a high rate of readmissions, a study carried out in China, with 544 patients who were discharged with follow-up for 59 days, 10 evolved to death after discharge and were included in the concurrent risk analysis and 50 patients were readmitted. Among readmitted patients, the average time was 7 days, of which 50% died[30].

The same flow was observed in a retrospective cohort study conducted in the United States, with 1,344 patients, of whom 16% returned to the emergency room, and 10% were re-hospitalized and 2% died, sharing common characteristics such as previous hospital admissions, advanced age and pre-existing chronic conditions[30].

It is possible to see that there is a relationship between patients with COVID-19 and those who need intensive care, thus requiring post-discharge care and care management planning. This is due to the prolonged period of hospitalization caused by the weakness of COVID-19 and the length of stay in the ICU that makes it prone to the development of PICS, which directly impacts the period of care in clinical wards, rehabilitation, and human resource flow ,as well as financial and readmissions[7,19].

The concern with the respiratory and cardiovascular dysfunctions that most patients present, according to the literature, makes it necessary for new approaches and evaluations in the recovery of this public[17,24,27,28]. In relation to this, a study focused on the rehabilitation of these patients, who, when they understand their severity, use models for assessing severity and pre-discharge from inpatient units[34]. An idea that brings into focus the concern with the careful and standardized analysis of the syndromes that patients can trigger, given the similarity of clinical conditions.

ID	Method	Year/ Country	Objective	Post-COVID-19 Syndrome (Clinical indicators)
1[15]	Systematic literature review	2020/ Greece	Assess rehabilitation scenarios post-COVID-19	Inflammatory syndrome, dyspnea, dysphagia, fatigue and muscle weakness.
2[16]	Systematic literature review	2021/ Japan	Assess the manifestations, developments and rehabilitation of dysphagia after COVID-19	Dysphagia
3[17]	Systematic literature review	2021/ USA	Investigate main post-hospitalization occurrences due to Covid-19	Hypercoagulation, vertigo, laryngotracheal lesions, swallowing and dyspnea
4[18]	Systematic literature review	2022/ Germany	Analyze new challenges in dysphagia and respiratory therapy after Covid-19	Dysphagia and respiratory dysfunction
5[19]	Case study	2020/ Italy	Assess persistent symptoms in patients discharged from the hospital after Covid-19 recovery	Fatigue, dyspnea, neuromuscular dysfunction, joint pain and chest pain
6[20]	Single center observational cohort study	2021/ Holland	Assess psychic suffering after hospitalization due to Covid-19 and quality of life	Stress and depression
7[21]	Case report	2021/ USA	Discuss or nutritional management patients during the post-ICU recovery phase, with a specific focus on COVID-19.	Dysphagia (swallowing) and malnutrition
8[22]	Prospective cohort study	2021/ Holland	Assess a view on the long-term, physical, social and psychological functioning of survivors of the COVID-19 ICU and their families three and six months after discharge from the ICU.	Depression, anxiety, stress and insomnia
9[23]	Retrospective cohort study	2021/ Holland	Get an insight into the experiences of COVID-ICU survivors.	Depression, stress and insomnia
10[24]	Retrospective cohort study	2021/ Italy	Assess the effectiveness of pulmonary rehabilitation	Mobility
11[25]	Retrospective observational study	2021/ Spain	Identify and quantify the frequency and outcomes associated with the presence of sequelae or persistent symptomatology (SPS) during the 6 months after discharge by COVID-19.	Fatigue, pain, skin injury, diarrhea, dyspnea, persistent fever, depression, anxiety, headache, insomnia and urinary tract infection
12[26]	Cohort study - single center	2021/ Italy	Determine the prevalence of symptoms among older survivors of COVID-19 and identify patterns of symptoms.	Fatigue, pain (muscle, joint and retrosternal), dyspnea, difficulty concentrating, judgment and reasoning
13[27]	Systematic literature review	2021/ USA	1. Describe the theoretical pathophysiology of long-term symptoms after Infection with SARS-CoV-2.2. Relate the post-COVID-19 symptoms to the pathophysiological mechanisms.3. Identify at least 2 strategies for the treatment of patients with post-COVID-19 symptoms.	Fatigue, skin changes, chronic inflammation, continuous lung infection, hyperclotiable state, dysphagia and diarrhoea
14[28]	Cross-sectional observational study	2021/ Brazil	To evaluate the cardiorespiratory fitness and neuromuscular activity of patients recovered from COVID-19.	DispneiaMuscle weakness

Source: Prepared by the authors, 2022.

Figure 2 - Results of selected publications. Natal, RN, Brazil, 2022

Relations	Characteristic changes of Post-Intensive Care Syndrome (PICS)		
	PHYSICAL	**COGNITIVE**	**PSYCHOLOGICAL**
Post-COVID-19 Syndrome (Clinical indicators)	Dispneia	Concentration	Depression
	Fatigue		
	Dysphagia		
	Malnutrition		
	Chronic diarrhea		Insomnia
	Skin changes		
	Pain		
	Weakness	Judgment	
	Inflammation		Stress
	Hypercoagualation state		
	Headache continues		
	Persistent fever		
	Respiratory dysfunction	Reasoning	Anxiety
	Neuromuscular dysfunction		
	Continuous lung infection		
	Laryngotracheal lesions		Vertigo
	Urinary tract infection		
	Mobility		

Source: Adapted from Teles, Teixeira e Rosa, 2019.
Figure 3 – Clinical indicators of post-COVID-19 Syndrome and its relationship with Post-Intensive Care Syndrome. Natal, RN, Brazil, 2022

In summary, a comprehensive, longitudinal approach after hospitalization and prolonged symptoms will require strategies and resources to address the common and divergent needs of these populations. Limiting term for Nursing science, since only one study was considered for this research, restricting most of the findings to medical and physiotherapy disciplines, not corroborating with the body of Nursing professionals working in the recovery of patients after critical illness, sometimes patients with PICS. Dantas et al [29] highlight the importance of implementing and standardizing taxonomies of a patient who has as many signs and symptoms as those affected by COVID-19 and PICS as seen in Figure 3. Thus, the combination of the two syndromes requires the implementation of a conscious nursing process by professionals.

It is necessary that nursing professionals understand the aspects that involve the field of PICS, not only in the clinical aspects of the patient, but also to the overall care developed for their needs. Focusing not only on the evolution of results and goals in the short term, but also evaluating the damage that the provision of nursing care can cause, in a scenario in which the survival of the critical patient will be resonant in the multidisciplinary conducts.

CONCLUSION

The study aimed to map the clinical relationships between Post-COVID-19 Syndrome and PICS, with the main clinical relationships being appreciated: dyspnea, fatigue, dysphagia, joint, muscle and interscapular pain, depression, weakness, insomnia and stress. Through the results, it will be possible to clarify the clinical indicators, aiming at the improvement of the health team in the assistance to this public, and their families, aiming at improvements in the quality of life. Furthermore, this research makes it possible to approach this theme in the teaching of future health professionals, given the advancement of this clinical profile after the pandemic period.

It is worth mentioning that, among the selected studies, only one was prepared in the light of nursing, and it is extremely important that research be developed in order to address and direct nursing care to the public with syndromes in several other scenarios, contributing to the

activities of daily life and social reintegration, as well as the insertion of preventive measures and promotion of health problems.

CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

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