

Nursing care management in substitutive renal therapy in patients with COVID-19: integrative review

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ABSTRACT

Introducción: Among the systems most affected by COVID-19, the renal system stands out, which leads to challenges in the management of nursing care for these patients.

Objetivos: To describe the scientific evidence on nursing care management in patients diagnosed with COVID-19 undergoing Renal Replacement Therapy.

Methodology: Articles were searched in PubMed, SCOPUS, Web of Science, LILACS, BDENF, EMBASE, IBECs, CINAHL, COCHRANE LIBRARY, and Scielo databases, using the following cross-references: "renal therapy" AND "nursing care" AND "covid-19". To systematize the searches, the Boolean operator "AND" was used. Initially, 167 primary references were identified in the selected databases/virtual library, and as a final sample, 14 articles were included.

Results: It was found that among the contributions to nursing care management in hemodialysis patient care in the context of the COVID-19 pandemic, the use of health technologies (examples: use of telehealth and the development of new protocols), development of new methods in nursing care management and continuing education are described in the literature. These tools were essential for the continuity of nursing care.

Conclusion: Among the tools used for nursing care management in the context of the pandemic of COVID-19

in hemodialysis patients, health technologies and continuing education in health are included, enabling qualified care management.

Keywords: renal replacement therapy; COVID-19; nursing.

ABSTRACT

Gestión de Cuidados de Enfermería en Terapia Renal Sustitutiva en Pacientes con COVID-19: Revisión Integradora

Introducción: Entre los sistemas más afectados por la pandemia COVID-19, destaca el sistema renal, circunstancia que conlleva desafíos en la gestión de cuidados de enfermería en los pacientes.

Objetivos: Describir la evidencia científica sobre la gestión de cuidados de enfermería en pacientes diagnosticados con COVID-19 sometidos a terapia renal sustitutiva.

Metodología: Se buscaron artículos en las bases de datos PubMed, SCOPUS, Web Of Science, LILACS, BDENF, EMBASE, IBECs, CINAHL, COCHRANE LIBRARY y Scielo, utilizando las siguientes palabras clave cruzadas: "renal therapy" AND "nursing care" AND "covid-19". Para sistematizar las búsquedas, se utilizó el operador booleano "AND". Inicialmente, se identificaron 167 referencias primarias en las bases de datos seleccionadas, y como muestra final, se incluyeron 14 artículos.

Resultados: Se encontró que entre las contribuciones a la gestión de cuidados de enfermería en la atención de pacientes en hemodiálisis en el contexto de la pandemia de COVID-19, se describen el uso de tecnologías de la salud (ejemplos: el uso de telemedicina y el desarrollo de nuevos protocolos), el desarrollo de nuevos métodos en la gestión de cuidados de enfermería y la educación continua. Estas herramientas fueron esenciales para la continuidad de los cuidados de enfermería.

Conclusión: Entre las herramientas utilizadas para la gestión de cuidados de enfermería en el contexto de la pandemia de COVID-19 en pacientes en hemodiálisis, se incluyen las tecnologías de la salud y la educación continua en salud, lo que permite una gestión de cuidados calificada.

Palabras clave: terapia de renal sustitutiva; COVID-19; enfermería.

INTRODUCTION

COVID-19 can cause multisystemic infections, as well as the acute respiratory syndrome¹ which, due to its transmissibility, has become a worldwide public health problem, reaching incalculable dimensions corresponding to deaths and confirmed cases in all continents².

In this context, pre-existing kidney disease, and especially when it is classified in terminal stage, represents a risk framework for the COVID-19 virus, as well as people who have undergone kidney transplantation. These situations are more prone to more severe complications of the infection, possibly leading to death^{3,4}.

Data indicate an incidence of 3 to 15% of acute kidney injury in people infected by SARS-CoV-2. In more clinically severe patients requiring intensive care, the renal injury rate increases to 14.5 to 50%⁵⁻⁷. About 20% of patients admitted to the Intensive Care Unit diagnosed with the new coronavirus require renal replacement therapy, on average 15 days after the onset of the disease⁷.

Acting in renal replacement therapy, nurses are a reference in caring for the population, establishing bond, trust relationship, guiding, listening and educating patients and their families. These professionals provide nursing care, detect complications that may occur during the process of renal replacement therapy, especially when the patient is clinically severe, which is the case of patients who develop kidney injury due to the new Coronavirus⁸.

Also, within the nurse's performance facing the hemodialysis process, it is necessary to plan the Systematization of Nursing Care, based and centered on logical reasoning and clinical judgment to conduct and monitor the patient's dialysis treatment during the process of becoming ill⁹.

Thus, research in the context of nursing care practice is necessary, considering the numerous impacts of COVID-19 on nursing care, and it is necessary that actions are applied in services, in order to improve nursing care provided to patients in renal replacement therapy diagnosed with COVID-19. From this perspective, the objective of this study was to describe the scientific evidence on nursing care management in patients diagnosed with COVID-19 undergoing renal replacement therapy.

METHODOLOGY

Design

This is an Integrative Literature Review to describe the evidence on the management of clinical nursing care in patients with a diagnosis of COVID-19 undergoing renal replacement therapy.

The study followed the recommendations of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA)¹⁰ to report the process of identification, screening, eligibility and inclusion of articles, as represented in **figure 1**.

The construction process followed the six steps proposed by Mendes, Silveira, and Galvão (2019)¹¹: identification of the topic and development of the guiding question; establishment of criteria for study selection, study categorization, analysis of the studies included in the review, interpretation of results, and presentation of the review.

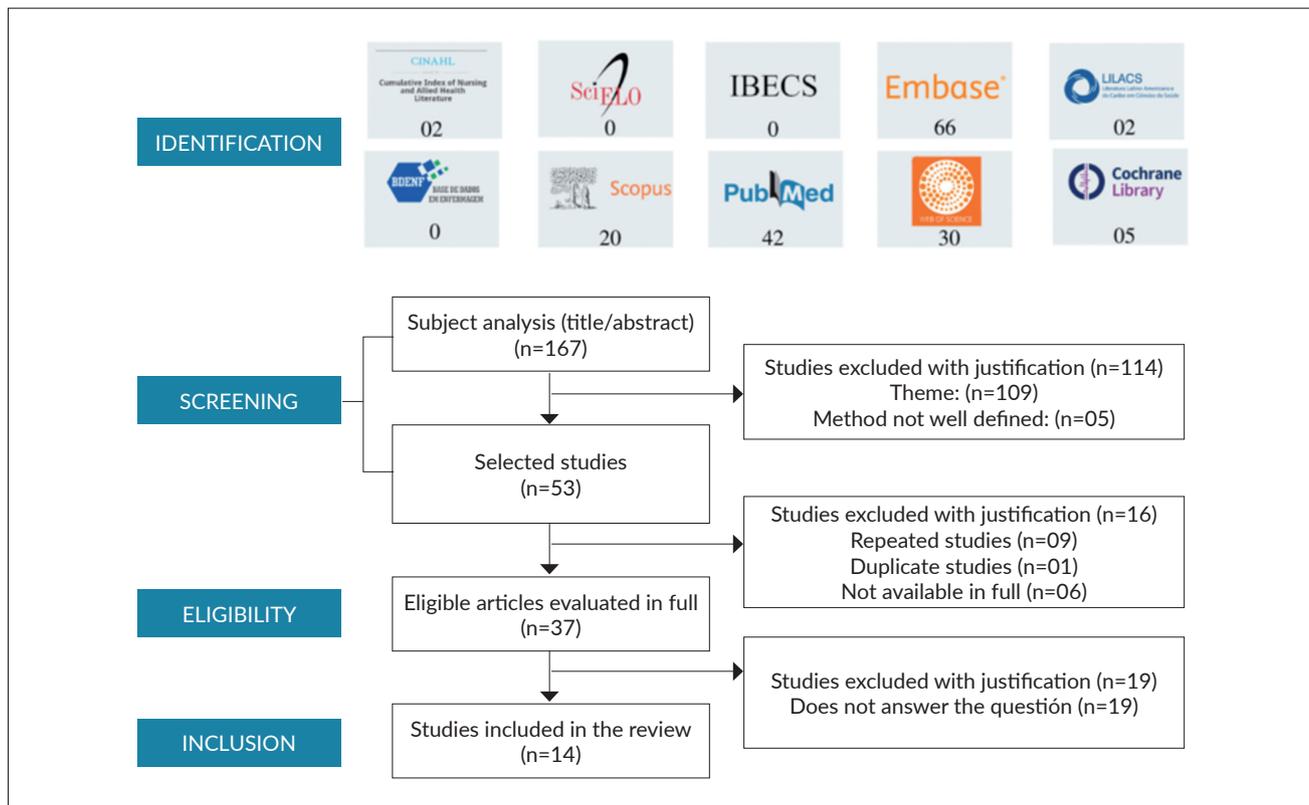
The operationalization of the research began with the definition of the guiding question: Which strategies identified in the literature are directed to the management of nursing care in renal replacement therapy in patients diagnosed with COVID-19?

Search method

The basis of the search strategy for the primary studies was determined by the delimitation of the combined controlled descriptors based on the logical structure of the PICO strategy, which is an acronym for Problem, Interest and Context, as shown in **table 1**.

In a paired manner, data collection was performed from May to July 2021 in the following databases: PubMed, SCOPUS, Web Of Science, Latin American and Caribbean Literature on Health Sciences (LILACS), Nursing Database (BDENF), EMBASE, IBECs, virtual library (SciELO), Cumulative Index to Nursing and Allied Health Literature (CINAHL), COCHRANE LIBRARY.

The search in the databases occurred by crossing the Descriptors in Health Sciences (DeCS): "renal therapy" AND "nursing care" AND "covid-19". To systematize the searches, the Boolean operator "AND" was used.



Source: Elaborated by the author.

Figure 1. Search process and selection of articles by crossing the terms Medical Subject Headings (MeSH), via databases and virtual library.

Inclusion and exclusion criteria

Inclusion criteria

The inclusion criteria were: articles available in full in Portuguese, English or Spanish.

Exclusion criteria

Studies of the type letter to the editor, dissertations, theses, repeated and duplicate studies were excluded. The analysis of references was based on publications from December 2019, justified by the emergence of the 1st case of COVID-19.

PRISMA Guideline

Initially, 167 primary references were identified in the selected databases/virtual library. After identification, the screening process began, through content analysis, which included reading the title, abstract and analysis of the adequacy to the inclusion criteria. In this process, the articles repeated among the selected ones were identified and, finally, the definitive selection of eligible references for reading in full was performed. The details of the search can be seen in **figure 1**.

The results of the researches of both researchers were compared, establishing agreement as to the formulation of the final sample. Initially, the studies were selected based on the title and abstract. Subsequently, the texts were carefully read in order to confirm the articles that answered the guiding question of the study.

The analysis of the results was performed from the complete reading of the articles and the extraction of data related to the theme. The results were organized and presented in tables, and the findings were interpreted and discussed critically and descriptively in light of the relevant literature.

Table 1. Subject descriptors located in the MeSH for the components of the research question according to the PICO strategy.

Strategy items	Components of the question	Subject descriptors (MeSH Terms)
P Population	Patients undergoing renal replacement therapy	"Renal Therapy"
I Area of interest	Management of clinical nursing care	"Nursing Care"
Co Context	Diagnosis of COVID-19	"COVID-19"

Source: Elaborated by the author.

Data extraction

For data extraction, it was performed an adaptation of the form proposed by Ursi and Galvão (2006)¹², contemplating the variables year, place, language, title, indexation base, objective, methodological design and results that answer the research question. With regard to the quality of the studies (**Table 2**), we used the Critical Appraisal Skills Programme (CASP)¹³.

Summary of the results

After the selection of studies, 14 articles were included for the review, according to the established inclusion and exclusion criteria.

Ethical aspects

It is punctuated that this study dispensed with the research ethics committee's appreciation because it is a study of review study using public domain data. It is emphasized that the ethical aspects in following the stages of the proposed review and the identification of the references used were respected.

RESULTS

Characterization of the studies included in the Review

Regarding the year of publication of the articles, it was observed a predominance of articles published in 2020, with 11 studies (79%) published in 2020 and three (21%) in 2021. Regarding the language of the manuscripts, all were published in English.

Regarding the themes addressed in the articles, an investigative approach was seen on aspects related to hemodialysis, nursing care management and strategies for coping with the pandemic, such as the use of health technologies and continuing education. Regarding the location where the studies were conducted, there was a predominance of articles from North America (N=09). The details can be seen in **table 2**.

Regarding the outcomes of the studies (**table 3**), it is observed that among the themes addressed involving the management of nursing care in the context of Renal Replacement Therapy and COVID-19, the literature discusses the team training. In

Table 2. Characterization of the studies included in the Review according to the year of publication, country of origin, published language, title, CASP and database.

Nº	YEAR/COUNTRY	LANGUAGE/ JOURNAL	TITLE	DATABASE	CASP
01 ¹⁴	Singapore, 2020	English American Journal of Kidney Diseases	Ensuring the Sustainability of Ongoing Kidney Replacement Therapy in the Face of Extraordinary Demand: Lessons from the COVID-19 Pandemic.	SCOPUS, PUBMED EMBASE e WEB OF SCIENCE	A
02 ¹⁵	United Kingdom, 2020	English Journal of the American Society of Nephrology.	Epidemiology of COVID-19 in an Urban Dialysis Center.	PUBMED EMBASE e WEB OF SCIENCE	A
03 ¹⁶	United States, 2021	English Current opinion in nephrology and hypertension.	Challenges in communication, prognostication and dialysis decision-making in the COVID-19 pandemic: implications for interdisciplinary care during crisis settings.	PUBMED	A
04 ¹⁷	United States, 2020	English International Journal of Nephrology and Renovascular Disease.	Inpatient Dialysis Planning During the COVID-19 Pandemic: A Single-Center Experience and Review of the Literature.	PUBMED EMBASE e WEB OF SCIENCE	A
05 ¹⁸	United States, 2020	English Nephrology Nursing Journal.	Management of COVID-19 in an Outpatient Dialysis Program.	PUBMED	A
06 ¹⁹	United States, 2020	English BMC nephrology.	COVID-19 infection control measures and outcomes in urban dialysis centers in predominantly African American communities.	PUBMED	A
07 ²⁰	China, 2021	English Renal Replacement Therapy.	Integrated management is effective in the prevention and control of COVID-19 in the blood purification center: joint efforts from multiple departments.	PUBMED	A

Nº	YEAR/COUNTRY	LANGUAGE/ JOURNAL	TITLE	DATABASE	CASP
08 ²¹	Oman, 2020	English BMC nephrology.	Fatigue, anxiety, depression and sleep quality in patients undergoing haemodialysis.	PUBMED	A
09 ²²	Germany, 2020	English Cureus.	Intensive Care Resources and 60-Day Survival of Critically-Ill COVID-19 Patients.	PUBMED	A
10 ²³	United States, 2020	English Pediatric Critical Care Medicine..	Rapid Transition of a PICU Space and Staff to Adult Coronavirus Disease 2019 ICU Car.	WEB OF SCIENCE	B
11 ²⁴	United States, 2021	English American Journal of Kidney Diseases.	Telehealth for Home Dialysis in COVID-19 and Beyond: A Perspective From the American Society of Nephrology COVID-19 Home Dialysis Subcommittee.	WEB OF SCIENCE	A
12 ²⁵	United States, 2020	English American Journal of Critical Care.	Rapid Critical Care Training of Nurses in the Surge Response to the Coronavirus Pandemic.	WEB OF SCIENCE	A
13 ²⁶	United States, 2021	English Chest.	Operational Recommendations for Scarce Resource Allocation in a Public Health Crisis.	EMBASE	B
14 ²⁷	Belgium, 2020	English Intensive and Critical Care Nursing.	Impact of COVID-19 on nursing time in intensive care units in Belgium.	EMBASE	A

Source: Survey data, 2021.

Table 3. Characterization of the studies included in the Review as objective, methodological design and synthesis of strategies for nursing care management in Renal Replacement Therapy in patients diagnosed with COVID-19.

Nº	PURPOSE OF THE STUDY	METHODOLOGICAL DESIGN	CONCLUSIONS AND STRATEGIES USED IN NURSING CARE MANAGEMENT
01 ¹⁴	Describe the existing strategies that can be implemented in renal replacement therapy in the context of crisis.	Qualitative	<ul style="list-style-type: none"> - Early training with nursing staff for monitoring and management of regional citrate anticoagulation and infection control. -Suggests interprofessional involvement in the development of new protocols, construction of simplified and easily accessible material, opting for audiovisual resources and making available on the intranet.
02 ¹⁵	To report the effect of the pandemic in a large urban dialysis population, identify risk factors for infection and transmission characteristics.	Cohort	Infection control strategies in dialysis centers were structured through screening measures (temperature and flu symptoms screening), isolation units for confirmed cases; use of specific PPE by the nursing team (gowns with sleeves and PFF3 masks) and early detection of suspected cases among professionals.
03 ¹⁶	Highlight challenges in communication, prognosis, and medical decision making that have been exacerbated by COVID-19	Case Study	<ul style="list-style-type: none"> - Evidence-based clinical operations and guideline documentation, - Use of telemedicine shared decision making; - Collaboration with Interdisciplinary to maintain concordant care goals.

Nº	PURPOSE OF THE STUDY	METHODOLOGICAL DESIGN	CONCLUSIONS AND STRATEGIES USED IN NURSING CARE MANAGEMENT
04 ¹⁷	Compare planning and experience in a tertiary care center with literature recommendations.	Qualitative	<ul style="list-style-type: none"> - The service sought to design policies in line with those developed by the Rhode Island Hospital Ethics Committee and detailed Standards of Care for kidney patient health crises. - Appoints out resources such as: layered algorithm to limit dialysis treatments to increase resources, heparin protocol, assessment of amount of dialysis needed based on acuity using the algorithm, and recommendations from disease, control, and prevention centers.
05 ¹⁸	To review the management of an outpatient dialysis program during the initial period of COVID-19 cases.	Retrospective study	<ul style="list-style-type: none"> - Strategies for infection control were implemented, such as the use of pictograms to facilitate patients' understanding of the measures applied (use of mask, organization of spatial logistics). - Application of the telehealth model. - Incorporation of a screening protocol.
06 ¹⁹	To describe the COVID-19 infection control measures implemented and the clinical characteristics of COVID-19 patients in dialysis facilities.	Retrospective study	<ul style="list-style-type: none"> - Infection control audits, new PPE training and Infection control practices. - Introduction of telemedicine.
07 ²⁰	Developing prevention strategies.	Quantitative	<ul style="list-style-type: none"> - Implementation of the multi-department integrated management for infection prevention and control in hemodialysis center - Elaboration of training model. The strategies used were: powerpoint course, Online lecture via DingTalk, Demonstration of on-site operation, Video learning, Evaluation of team theory and personal protection, patient education.
08 ²¹	To determine the prevalence of fatigue, anxiety, depression, and sleep quality among hemodialysis patients during the COVID-19 pandemic and explore contributing predictors.	Transversal	<ul style="list-style-type: none"> - Fatigue, depression, anxiety and sleep quality are significant problems for patients undergoing hemodialysis. The study suggests support services, online workshops and training material to enable the recognition of these manifestations. - Evaluation scales and longitudinal studies can serve as a subsidy to identify the prevalence of these complaints.
09 ²²	To analyze the results of the resources applied in patients with COVID-19 and respiratory failure admitted to the ICU.	Retrospective	The study reports the main interventions to the patient with COVID-19 within the intensive care unit, among which counts dialysis, in this therapy was used the Rockwood clinical fragility score.
10 ²³	To describe the process of transition from a PICU to a medical ICU and its model of care during the pandemic of COVID-19	Descriptive and retrospective	<ul style="list-style-type: none"> - Supervised Team Pyramid Model. - Just in time" trainings. - Daily 30-minute Virtual Discussions led by intensivists that allowed rapid dissemination of information on specific care aspects of COVID-19, i.e., mechanical ventilation, immune modulators, anticoagulation, and renal replacement therapy.

Nº	PURPOSE OF THE STUDY	METHODOLOGICAL DESIGN	CONCLUSIONS AND STRATEGIES USED IN NURSING CARE MANAGEMENT
11 ²⁴	Evaluation of telehealth in the pandemic of COVID-19.	Scientific-technical recommendation.	<ul style="list-style-type: none"> - Development of platforms to hold videoconferences and interdisciplinary teams to adapt to virtual visits. - Decision support tool that helps in the evaluation of risk factors that may trigger in a face-to-face visit (Applied by the nurse). - Suggests that future guidelines on the use of telehealth, quality measures and research on the topic need to be explored.
12 ²⁵	Develop and implement a three-hour curriculum for training nurses and non-critical care staff to manage clinically ill patients with COVID-19 disease.	Intervention study.	<ul style="list-style-type: none"> - Among the various topics covered in the training program, renal replacement therapy was incorporated, in view of the high incidence of renal failure and shock in critically ill patients. Topics such as: machine configuration, common alarms and potential troubleshooting were addressed. - Construction of a care protocol for critically ill patients by COVID-19.
13 ²⁶	Describe the resource allocation process during the pandemic in five health systems in Maryland.	Scientific-technical recommendation.	<ul style="list-style-type: none"> - Electronic TRS algorithm aimed at conserving equipment, supplies and personnel. - SOFA Score Calculator. - Information materials for patients and families.
14 ²⁷	To evaluate the nurse-to-patient ratio required by COVID-19 and identify the factors influencing nursing.	Retrospective observational.	<ul style="list-style-type: none"> - Application of the Nursing Activities Score (NAS). - Medical Severity Scores.

Source: Survey data, 2021.

view of this, taking into account the lack of knowledge of the new coronavirus, especially at the beginning of the pandemic and the challenges it imposed on the health system, the training of health professionals was one of the ways to deal with COVID-19.

In the context of health care, technologies were essential to face COVID-19, such as the development of new protocols, aiming at organizing and directing nursing care. In line with this, Continuing Education contributed directly to the fight against the pandemic, being used mainly in forms of training with the team, involving virtual discussions, online workshops, availability of training materials, videoconferences and use of telehealth technology.

DISCUSSION

Nursing Care Management in Renal Replacement Therapy

In various environments and levels of health care, the role of the nursing professional is revealed in the coordination and management of health teams and services. Currently, nursing accounts for more than half of the workforce in the health care context²⁸.

Nursing was presented as a profession that acts on several fronts in the fight against the pandemic. However, the work

of nursing has already been seen in other historical moments, whether in epidemics or catastrophes that have affected humanity. Several times, they put themselves in danger to provide health care. In COVID-19, nurses were exposed to SARS-Cov-2 in long working days²⁹.

In health institutions, timely organizational planning was necessary in order to meet the needs of material and human resources, composition of integrated interventions and definition of various action plans due to the pandemic context. In all the processes for restructuring health services, nursing management was fundamental^{30,31}.

From the perspective of renal replacement therapy, the nurse is the professional responsible for managing the care of patients on hemodialysis, which in turn requires knowledge and leadership, and in times of pandemic, resilience and appropriate management to meet the challenges imposed by the new coronavirus. It is urgent to ensure a qualified care with better health outcomes for patients. It is worth noting that, in a certain period of the pandemic, managers and health professionals faced a scenario of uncertainty, being the basis with scientific evidence the best reference for safe care^{32,33}. Among the evidence of the consequences of COVID-19, acute kidney injury is included. As a result, these patients require intensive care, so the nursing team has an important contribution in participating in the management of care to this

public, given also the complications of respiratory infections linked to the kidney problem. Given this demand, it is important that nurses develop strategies aimed at patient safety, since they are responsible for managing nursing care³³.

It is also noteworthy that the scenario triggered by the pandemic unveiled new forms of care, through an improved practice and supported by scientific evidence, being able to provide patient safety. Thus, nursing when implementing dialysis to a patient with COVID-19 requires preparation and understanding for the early identification of possible complications in order to mitigate adverse events in the dialysis process³⁴.

Health technologies in the pandemic context

Due to the international public health emergency scenario, there was a need for change in the traditional care model. Healthcare organizations had to interrupt face-to-face care and invest in technological solutions to perform clinical follow-up of patients in a non-face-to-face manner^{35,36}. An example of technology observed in the integrative review sample that allowed the continuation of care even remotely is the use of telehealth technology.

Telehealth technology played a significant role in service delivery at three points in the SARS-Cov-2 pandemic: (1) outpatient home care; (2) initial hospital outbreak of COVID-19; and (3) case recovery and treatment^{37,38}.

In addition, there is evidence on the benefits of telehealth, such as reducing the time of care, cost / time of travel of the patient to the health service and quality of service provided. Thus, it has become a tool that enables more agile access to expert professionals^{39,40}.

Given the scope and flexibility of technologies, such as digital technologies, which in the context of health provide innovative solutions for the provision of services, offering a range of possibilities in situations of epidemics or more serious scenarios, as experienced in the current pandemic⁴¹.

Thus, the advance of interactive technologies in the health area is considered an effective and safe option for patient care, in which it allows contact between the professional and the client. Consequently, the pandemic of COVID-19 caused a revolution in the health sector, since the imposition of the need for new strategies and adequacy of services facing the new reality⁴². Social vulnerability is considered a limiting condition for the population's access to digital health technologies.

Continuing education in the COVID-19 scenario

Regarding this theme, it was found that some studies address Continuing Education as a strategy, both as a tool for coping with COVID-19, and also to improve the management of nursing care to the patient. And furthermore, reinforcing such statement, Gama and collaborators (2021)⁴³ reinforce the need for constant updating of health professionals, considering the epidemic scenario.

An essential priority in the management of nurses in the care of the individual with COVID-19 is to provide continuous training. In this regard, the World Health Organization recommends training in health services, according to the need for technical and scientific updates^{44,45}.

Other literature reinforces this need for training for nursing professionals who are on the front line of the pandemic, aiming at the consistent use of exposure barriers, as well as fundamental adjustments in the structure of operational flows of services and health challenges^{46,47}.

Due to the global health crisis, it was necessary to structure Institutional Protocols, based on the Protocols of the Ministry of Health. One of the tactics used for the dissemination of information were educational actions, with the support of Continuing Education, intending the systematization of nursing care⁴⁸.

For Santos and collaborators (2021)⁴⁹, the implementation of Continuing Education during the pandemic was challenging, due to some factors such as keeping up with the numerous protocol updates and, along with that, the training of the multiprofessional team. Thus, this method has several potentialities, such as the propagation and continuous exchange of knowledge among health professionals.

Given the problems emerged by SARS-Cov-2 in public health worldwide, Continuing Education is an essential tool in facing the pandemic of COVID-19, with the purpose of promoting knowledge, transforming professional practice and establishing strategies for coherent assistance⁴⁹.

Limitations of the study

The study is limited by presenting data with a generalist focus, not evidencing actions for the management of nursing care in Renal Replacement Therapy for specific audiences in the context of the pandemic of COVID-19.

Practical considerations

COVID-19 as other pandemics left numerous marks in society, however, the data of previous pandemics were important to project the potentiality of the new coronavirus. Thus, the data presented in this review were essential for the management of nursing care to hemodialysis patients, since health technologies and continuing education were instruments that improved nursing practice for a qualified assistance.

Based on the results of this review, in the management of nursing care for patients undergoing renal replacement therapy with COVID-19, due to the obstacles imposed by the new coronavirus, there has been a need to reorganize and develop new strategies in the global health system. Thus, among the tools used for care management are health technologies, even if not in person, in the case of telehealth.

For nursing, the technologies contributed to various aspects of the care process, such as protocols, which guide assistance

and organize the service at the same time. Another important tool for the consolidation of care management in an effective way is the permanent education, which allowed the updating of health professionals, taking into account the constant discoveries about COVID-19.

Thus, such data can serve for future epidemics/pandemics, given the frequency of these phenomena. Considering the technologies and continuing education as essential tools to assist in the health-disease context, and also in the professionals' training processes.

Conflict of interest

The authors declare that they have no potential conflicts of interest related to the content presented in the review.

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