PROTOCOL

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SKIN INJURIES ASSOCIATED WITH VASCULAR ACCESS DEVICES: SCOPING REVIEW PROTOCOL

LESÕES DE PELE ASSOCIADA AO DISPOSITIVO DE ACESSO VASCULAR: PROTOCOLO DE REVISÃO DE ESCOPO

LESIONES CUTÁNEAS ASOCIADAS A DISPOSITIVOS DE ACCESO VASCULAR: PROTOCOLO DE REVISIÓN DE ALCANCE

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Submission: 10-11-2025
Approval: 14-01-2026

RESUMO
Objetivo: Relatar o protocolo de uma revisão de escopo que visa mapear e sintetizar as evidências científicas disponíveis sobre as definições de lesões de pele relacionadas a adesivos médicos e das lesões de pele associadas a cateteres em locais de inserção de dispositivos intravenosos. **Métodos:** Trata-se de um protocolo de revisão de escopo, desenvolvido em cinco etapas: Identificação da questão de pesquisa, utilizando a estratégia População, Conceito e Contexto; Identificação dos estudos relevantes, no qual a busca dos estudos será realizada nas principais bases de dados da área da saúde; Seleção dos estudos: será realizada a triagem inicial, a seleção dos estudos e a extração dos dados na plataforma Covidence; Análise dos dados, será realizada a caracterização e descrição dos artigos; e, Agrupamento, resumo e apresentação dos resultados de forma narrativa e quantitativa descritiva, integrando os achados aos objetivos da revisão de escopo, seguindo o *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews*.
Palavras-chave: Cateteres Venosos Centrais; Pele; Revisão de Escopo.

ABSTRACT
Objective: To report the protocol of a scoping review that aims to map and synthesize the available scientific evidence regarding the definitions of medical adhesive-related skin injuries and catheter-associated skin injuries at intravenous device insertion sites. **Methods:** This is a scoping review protocol developed in five stages: Identification of the research question, using the Population, Concept, and Context strategy; Identification of relevant studies, in which the search will be conducted in the main health-related databases; Study selection, which will involve initial screening, study selection, and data extraction using the Covidence platform; Data analysis, which will include the characterization and description of the articles; and Grouping, summarization, and presentation of results in a narrative and descriptive quantitative format, integrating the findings with the objectives of the scoping review, following the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.*
Keywords: Central Venous Catheters; Skin; Scoping Review.

RESUMEN
Objetivo: Informar el protocolo de una revisión de alcance que tiene como propósito mapear y sintetizar la evidencia científica disponible sobre las definiciones de lesiones cutáneas relacionadas con adhesivos médicos y de las lesiones cutáneas asociadas a catéteres en los sitios de inserción de dispositivos intravenosos. **Métodos:** Se trata de un protocolo de revisión de alcance desarrollado en cinco etapas: Identificación de la pregunta de investigación, utilizando la estrategia Población, Concepto y Contexto; Identificación de los estudios relevantes, en la cual la búsqueda se realizará en las principales bases de datos del área de la salud; Selección de los estudios, que incluirá la evaluación inicial, la selección de los estudios y la extracción de los datos mediante la plataforma Covidence; Análisis de los datos, en el que se realizará la caracterización y descripción de los artículos; y Agrupamiento, síntesis y presentación de los resultados en formato narrativo y descriptivo cuantitativo, integrando los hallazgos con los objetivos de la revisión de alcance, siguiendo las *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.*
Palabras clave: Catéteres Venosos Centrales; Piel; Revisión de Alcance.

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INTRODUCTION

Invasive devices are very common in hospital settings, being used in almost 80% of patients. [1] Among these cases, a complication rate of 27% is observed, including those related to the skin.[1] In 2013, the definition of MARSI (Medical Adhesive-Related Skin Injuries) was proposed, being considered as any damage to the patient's skin resulting from the use of adhesive products of any nature, from electrodes to venous access dressings and wounds.[2] It is noteworthy that MARSI is a type of injury that is preventable, yet common in the hospital setting and generally underreported.[2,3]

Any patient who needs adhesives to secure devices is at risk of developing MARSI.[3,4] A prospective cohort study, conducted in intensive care units of two Brazilian hospitals, investigated daily patients using central venous catheters, nasogastric tubes, nasoenteric tubes, and indwelling urinary catheters and showed that the MARSI rate was 42% in these patients.[4] Among the most common sites of MARSI occurrence, the following stand out. Venous catheterization sites and the use of transparent films.[5]

It is worth noting that, of the invasive devices used in the hospital setting, Vascular Access Devices (VADs) are the most widely used, as mentioned.[1] VADs are widely used and indicated for the administration of fluid therapy, antibiotics, chemotherapy, and parenteral nutrition.[6] Despite their frequent use, VADs present risks, such as skin complications resulting from frequent dressing changes, application of irritating antiseptics, and treatments that can damage the skin around the device over time.[7]

Patients requiring VADs often have multiple comorbidities, including nutritional deficiencies, hematological disorders, or cancer.[6,8] These conditions, associated with extremes of age, such as neonates and the elderly, dry skin, long hospital stays, and repetitive adhesive removal, can compromise the skin around the device insertion site, resulting in an increased risk of skin damage.[3,4,7,8] Such damage They can cause microbial contamination and, consequently, increase the risk of catheter-related bloodstream infection.[3]

When the complication occurs in the skin around the catheter insertion site, it is called Catheter-Associated Skin Injury (CASI), defined as the presence of exudation, erythema, vesicles, blisters, erosions, lacerations, or other skin lesions at the catheter site and after dressing removal, persisting for ≥30 minutes.[8]

As mentioned, MARSI was introduced in 2013[2] and, since then, several studies have sought strategies for preventing and treating these lesions, although they are still frequently underreported.[3-5] The CASI concept, proposed in 2017[8], also covers skin lesions caused by medical adhesives, such as those resulting from friction or peeling off the skin. However, their use is still not widespread in research related to intravenous devices, which often results in

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misunderstandings in the application of both terms.[7-9]

Given the emergence of these concepts and the recognition that these complications can cause serious harm to patients, it is essential that education on the identification and prevention of MARSI and CASI be made widely and accessibly available in order to significantly reduce the risk associated with these injuries.[3] However, the identification and classification of these complications still represent a challenge due to the diversity of existing definitions and the complexity of the observed clinical manifestations.[2,9]

Thus, it is relevant to conduct a scoping review with the aim of mapping and synthesizing the available scientific evidence on the definitions of skin lesions related to medical adhesives and skin lesions associated with catheters at intravenous device insertion sites. This review will allow the identification of knowledge gaps regarding the use of nomenclatures, guide future research, and support more effective prevention and clinical management practices.

METHODS

This is a scoping review protocol. Scoping reviews are characterized by presenting a synthesis of the main evidence, methods, and gaps in the studies found.[10] The protocol is registered on the Open Science Framework (OSF) platform, under the identification 92WNF.

Following the steps proposed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) and the JBI guide for scoping reviews[10,11], this work will be developed following these steps: 1. Identification of the research question; 2. Identification of relevant studies; 3. Selection of studies; 4. Data analysis; 5. Grouping, summarizing, and presentation of data.

1. Identification of the research question

To formulate the guiding question for the review, the strategy represented by the acronym PCC was used, which means: P – Population; C – Concept; C – Context (Chart 1).

Chart 1 - Structuring the research question using the acronym PCC

P – Population	C – Concept	C – Context
Hospitalized patients	Skin lesion related to medical adhesive and skin lesion associated with catheter.	Vascular access devices

Therefore, the guiding question of this investigation is: What scientific studies available in the literature address the definitions, prevalence, and risk factors of medical adhesive-

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related skin lesions (MARSI) and catheter-associated skin lesions (CASI) in hospitalized patients with central and peripheral vascular access devices?

2. Identification of relevant studies

The sample will be one of convenience, where all articles found through a delineated search strategy that meet the inclusion criteria will be included.

Inclusion criteria

- Population/participants: hospitalized individuals with medical adhesive-associated skin lesions (MARSI) or catheter-related skin lesions (CASI);
- Study design: original articles of different designs, such as: descriptive, exploratory, experimental and quasi-experimental studies, primary studies; systematic reviews and meta-analyses.
- Research period: from 2013 (proposal of the MARSI definition[2])
- Language of articles: English, Spanish and Portuguese.

Exclusion criteria

- Studies focused on other types of skin lesions besides MARSI or CASI.
- Full text not available in its entirety in the databases.
- Methodological studies, editorials, letters to the editor, abstracts, expert opinions, conference proceedings.

The search will be conducted in the following databases: National Library of Medicine (PubMed), Embase, Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Latin American and Caribbean Literature in Health Sciences (LILACS), with the aim of identifying the largest possible number of available studies. The search strategy was developed in conjunction with a librarian specializing in the health field, following the recommendations proposed by the Peer Review of Electronic Search Strategies (PRESS).(12) The search terms included Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) related to three main axes: (1) dermatological care ("skin care", "dermatology", "wound care", and equivalents in Portuguese and Spanish); (2) wound care materials ("bandages", "adhesives", "wound dressings", and equivalents in the three languages); and (3) vascular access ("central venous catheter", "vascular access", "PICC line", with their translations).

Depending on the database, the descriptors will be adjusted according to language and specificities, along with the combination of Boolean operators (AND/OR) to broaden the coverage and precision of the results (Chart 2).

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Chart 2 - Search strategy.

Database	Search Strategy
PubMed	("skin care"[All Fields] OR "skin injury"[All Fields] OR "skin diseases"[All Fields] OR "skin protection"[All Fields] OR "dermatologic care"[All Fields] OR "cutaneous care"[All Fields] OR "dermatology"[All Fields] OR "wound care"[All Fields] OR "epidermal care"[All Fields]) AND ("bandages"[All Fields] OR "adhesives"[All Fields] OR "marsi"[All Fields] OR "medical adhesives"[All Fields] OR "wound dressings"[All Fields] OR "tapes"[All Fields] OR "medical tapes"[All Fields] OR "dressing materials"[All Fields]) AND ("casi"[All Fields] OR "central venous access"[All Fields] OR "central venous catheter"[All Fields] OR "catheter related infections"[All Fields] OR "vascular access devices"[All Fields] OR "catheterization peripheral"[All Fields] OR "central venous catheters"[All Fields] OR "vascular access"[All Fields] OR "PICC line"[All Fields] OR "peripherally inserted central catheter"[All Fields] OR "intravenous access"[All Fields] OR "vascular catheters"[All Fields] OR "intravenous catheters"[All Fields] OR "central line"[All Fields])
CINAHL	(("skin care" OR "skin injury" OR "skin diseases" OR "skin protection" OR "dermatologic care" OR "cutaneous care" OR "dermatology" OR "wound care" OR "epidermal care") AND ("bandages" OR "adhesives" OR "marsi" OR "medical adhesives" OR "wound dressings" OR "tapes" OR "medical tapes" OR "dressing materials") AND ("casi" OR "central venous access" OR "central venous catheter" OR "catheter related infections" OR "vascular access devices" OR "catheterization, peripheral" OR "central venous catheters" OR "vascular access" OR "PICC line" OR "peripherally inserted central catheter" OR "intravenous access" OR "vascular catheters" OR "intravenous catheters" OR "central line"))
Embase	('skin injury'/exp OR 'cutaneous trauma':ti,ab,kw OR 'cutaneous wound':ti,ab,kw OR 'skin artifact':ti,ab,kw OR 'skin injury':ti,ab,kw OR 'skin trauma':ti,ab,kw OR 'skin wound':ti,ab,kw OR 'traumatic skin lesion':ti,ab,kw OR 'wound, skin':ti,ab,kw OR 'skin disease'/exp OR 'cutaneous disease':ti,ab,kw OR 'dermal disease':ti,ab,kw OR 'dermal disorder':ti,ab,kw OR 'dermatopathology':ti,ab,kw OR 'dermatopathy':ti,ab,kw OR 'dermatosis':ti,ab,kw OR 'dermopathy':ti,ab,kw

	OR 'disease, cutaneous':ti,ab,kw OR 'disease, dermal':ti,ab,kw OR 'facial dermatoses':ti,ab,kw OR 'foot dermatoses':ti,ab,kw OR 'leg dermatoses':ti,ab,kw OR 'scalp dermatoses':ti,ab,kw OR 'skin and connective tissue diseases':ti,ab,kw OR 'skin disease':ti,ab,kw OR 'skin diseases':ti,ab,kw OR 'skin diseases, genetic':ti,ab,kw OR 'skin disorder':ti,ab,kw) AND ('tissue adhesive'/exp OR 'adhesive, tissue':ti,ab,kw OR 'aneurysmorrhaphy tissue adhesive':ti,ab,kw OR 'surgical adhesive':ti,ab,kw OR 'tissue adhesive':ti,ab,kw OR 'tissue adhesives':ti,ab,kw OR 'tissue glue':ti,ab,kw OR 'wound dressing'/exp OR 'amd telfa':ti,ab,kw OR 'adaptic (wound dressing)':ti,ab,kw OR 'adaptic touch':ti,ab,kw OR 'algisite':ti,ab,kw OR 'aquacel':ti,ab,kw OR 'askina calgitrol':ti,ab,kw OR 'atrauman':ti,ab,kw OR 'autologel':ti,ab,kw OR 'biostep':ti,ab,kw OR 'curasorb':ti,ab,kw OR 'cutilin':ti,ab,kw OR 'cutimed sorbact':ti,ab,kw OR 'drymax':ti,ab,kw OR 'eclypse (wound dressing)':ti,ab,kw OR 'excellagen':ti,ab,kw OR 'flivasorb':ti,ab,kw OR 'graftskin':ti,ab,kw OR 'hemcon':ti,ab,kw OR 'hemcon bandage pro':ti,ab,kw OR 'hemcon dental dressing pro':ti,ab,kw OR 'hemcon nasal plug':ti,ab,kw OR 'hemcon strip pro':ti,ab,kw OR 'jaloskin':ti,ab,kw OR 'kerrafoam simple':ti,ab,kw OR 'kerramax':ti,ab,kw OR 'leukomed':ti,ab,kw OR 'leukomed sorbact':ti,ab,kw OR 'medihoney':ti,ab,kw OR 'opsite (wound dressing)':ti,ab,kw OR 'primapore':ti,ab,kw OR 'promogran':ti,ab,kw OR 'quickclot acs':ti,ab,kw OR 'seasorb':ti,ab,kw OR 'silvercel':ti,ab,kw OR 'sorbion':ti,ab,kw OR 'steri-strips':ti,ab,kw OR 'stratasorb':ti,ab,kw OR 'suprathel':ti,ab,kw OR 'surfasoft':ti,ab,kw OR 'telfa':ti,ab,kw OR 'tielle':ti,ab,kw OR 'veloderm':ti,ab,kw OR 'zetuvit':ti,ab,kw OR 'askina sorb':ti,ab,kw OR 'biobrane':ti,ab,kw OR 'dressing, wound':ti,ab,kw OR 'external pledget':ti,ab,kw OR 'inflammatory skin disorder dressing':ti,ab,kw OR 'non-sterile medicated wound dressing kit':ti,ab,kw OR 'oasis (wound dressing)':ti,ab,kw OR 'sterile medicated wound dressing kit':ti,ab,kw OR 'sterile non-medicated wound dressing kit':ti,ab,kw OR 'wound dressing':ti,ab,kw OR 'wound dressing agent':ti,ab,kw OR 'wound dressing kit':ti,ab,kw OR 'wound dressing kit, medicated, non-sterile':ti,ab,kw OR 'wound dressing kit, medicated, sterile':ti,ab,kw OR 'wound dressing kit, non-medicated, sterile':ti,ab,kw) AND ('central venous catheter'/exp OR

	'axera':ti,ab,kw OR 'broviac':ti,ab,kw OR 'cvp line':ti,ab,kw OR 'careflow (central venous catheter)':ti,ab,kw OR 'cook spectrum (central venous catheter)':ti,ab,kw OR 'groshong':ti,ab,kw OR 'icy (central venous catheter)':ti,ab,kw OR 'logicath':ti,ab,kw OR 'leonard':ti,ab,kw OR 'leonard catheter':ti,ab,kw OR 'orion ii':ti,ab,kw OR 'pediasat':ti,ab,kw OR 'powerline (central venous catheter)':ti,ab,kw OR 'powerwand':ti,ab,kw OR 'pro-line':ti,ab,kw OR 'secalon-t':ti,ab,kw OR 'vortex (central venous catheter)':ti,ab,kw OR 'vortex port':ti,ab,kw OR 'catheter, central venous':ti,ab,kw OR 'central intravenous catheter':ti,ab,kw OR 'central line':ti,ab,kw OR 'central vein catheter':ti,ab,kw OR 'central venous access catheter':ti,ab,kw OR 'central venous access device':ti,ab,kw OR 'central venous catheter':ti,ab,kw OR 'central venous catheter, device':ti,ab,kw OR 'central venous catheterization kit, short-term':ti,ab,kw OR 'central venous catheters':ti,ab,kw OR 'central venous line':ti,ab,kw OR 'cv cath':ti,ab,kw OR 'short-term central venous catheterization kit':ti,ab,kw OR 'vascular access'/exp OR 'artery access':ti,ab,kw OR 'vascular access':ti,ab,kw OR 'vein access':ti,ab,kw OR 'catheter infection'/exp OR 'catheter associated infection':ti,ab,kw OR 'catheter associated infections':ti,ab,kw OR 'catheter infection':ti,ab,kw OR 'catheter related infection':ti,ab,kw OR 'catheter related infections':ti,ab,kw OR 'catheter site infection':ti,ab,kw OR 'catheter-related infections':ti,ab,kw OR 'catheterization site infection':ti,ab,kw OR 'infected catheter':ti,ab,kw) AND [embase]/lim
Cochrane Library	(("skin care" OR "skin injury" OR "skin diseases" OR "skin protection" OR "dermatologic care" OR "cutaneous care" OR "dermatology" OR "wound care" OR "epidermal care") AND ("bandages" OR "adhesives" OR "marsi" OR "medical adhesives" OR "wound dressings" OR "tapes" OR "medical tapes" OR "dressing materials") AND ("casi" OR "central venous access" OR "central venous catheter" OR "catheter related infections" OR "vascular access devices" OR "catheterization, peripheral" OR "central venous catheters" OR "vascular access" OR "PICC line" OR "peripherally inserted central catheter" OR "intravenous access" OR "vascular catheters" OR "intravenous catheters" OR "central line"))
LILACS	(("skin care" OR "cuidado da pele" OR "skin injury" OR "lesão de pele" OR "skin diseases" OR "doenças da pele" OR "skin protection" OR

	"proteção da pele" OR "dermatologic care" OR "cuidado dermatológico" OR "cutaneous care" OR "cuidado cutâneo" OR "dermatology" OR "dermatologia" OR "wound care" OR "cuidado de feridas" OR "epidermal care" OR "cuidado epidérmico") AND ("bandages" OR "bandagens" OR "adhesives" OR "adesivos" OR "marsi" OR "medical adhesives" OR "adesivos médicos" OR "wound dressings" OR "curativos para feridas" OR "tapes" OR "fitas" OR "medical tapes" OR "fitas médicas" OR "dressing materials" OR "materiais de curativo") AND ("casi" OR "acesso venoso central" OR "central venous access" OR "cateter venoso central" OR "central venous catheter" OR "infecções relacionadas ao cateter" OR "catheter related infections" OR "dispositivos de acesso vascular" OR "vascular access devices" OR "cateterização periférica" OR "catheterization, peripheral" OR "cateteres venosos centrais" OR "central venous catheters" OR "acesso vascular" OR "vascular access" OR "linha PICC" OR "PICC line" OR "cateter venoso central de inserção periférica" OR "peripherally inserted central catheter" OR "acesso intravenoso" OR "intravenous access" OR "cateteres vasculares" OR "vascular catheters" OR "cateteres intravenosos" OR "intravenous catheters" OR "linha central" OR "central line")) AND (db:("IBECS" OR "WPRIM") AND la:("es" OR "en"))

3. Study Selection

Using the Covidence Platform, four independent researchers will initially screen the studies based on reading the titles, abstracts, and applying the previously established eligibility criteria. In case of disagreement among the reviewers, a fifth researcher will be responsible for the final decision regarding the inclusion of the study. Duplicate articles identified at this stage will be excluded.

Subsequently, the selected articles will undergo a thorough full-text reading, conducted by the four researchers, to identify those that meet the inclusion criteria of the review. Studies that do not meet these criteria will be excluded. Disagreements regarding the inclusion or exclusion of articles will be resolved in a consensus meeting among the five researchers involved in this stage.

Afterward, the data will be extracted using an extraction tool, integrated into Covidence, developed by the researchers to gather the main information necessary for the study (Table 3):

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Chart 3 - Data Extraction Tool

Variable	Extraction Details
Article Identification	
Title of the study	Full title of the evidenceh
Authors	First and last names of all authors of the study.
Year of publication	Year of publication of the study.
Origen/Country of the study	City or country where the study was conducted.
Source of the publication	Name of the periodics/magazine
Method	
Design of the study	Type of the study
Nível de evidência	Classificação da qualidade das evidências
População/número de participantes	Tamanho amostral
Objective of the study	Main objective of the study
Characteristics of stroke and complications	
Catheter characteristics and number	Type of catheter and total number
MARSI concept	Full description of the MARSI concept.
CASI concept	Full description of the CASI concept.
Tool developed by MARSI and CASI	Describe the use of the tool on MARSI or CASI.
Clinical signs of cutaneous complications at catheter insertion site.	Describe how the clinical signs of cutaneous complications presented during catheter insertion are classified.
Limitations of the study	Describe the limitations presented in the study.

Considering that this study is a scoping review, evaluation by the Ethics Committee for research with human subjects is not necessary, since only data from previously published studies were used.

4. Data Analysis

For the analysis of the results, the findings will be grouped into thematic categories for better discussion and interpretation, based on the objective and guiding question of the review. Thus, the articles will be characterized by describing the concepts of MARSI and CASI found in each study, with the aim of identifying and comparing the similarities, differences, and complementarities of these concepts.

Furthermore, the existence of tools that use these definitions and how they are applied in clinical practice or research will be verified. Furthermore, an analysis of the evidence from each study will be conducted, in accordance with the Oxford Centre for Evidence-Based Medicine, which classifies scientific evidence into five different levels: level 1 being systematic reviews

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and randomized clinical trials, level 2 quasi-experimental studies, level 3 observational studies of the cohort or case-control type, level 4 cross-sectional studies, and level 5 expert opinion.[13]

5. Grouping, summarizing, and presenting the data

The results will be presented through a narrative of the results, integrating the findings with the objectives of the scoping review. Tables and charts will be constructed for better visualization of the results. The presentation will use visual resources (flowcharts, charts, graphs) and will follow the PRISMA-ScR for systematization.[10]

The results will support healthcare professionals, especially nurses, in the recognition, treatment, and prevention of these lesions at vascular access sites, providing evidence that can guide future research and clinical protocols.

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Funding and Acknowledgments:

This work was carried out with the support of the National Council for Scientific and Technological Development (CNPq), through Processes No. 406103/2023-2 (CNPq/MCTI Call No. 10/2023 - Project “Educational and Assistance Technologies for the Prevention of Adverse Events of Vascular Access Devices in Pediatric Patients”) and No. 309565/2022-7 (CNPq Call No. 09/2022 – Research Productivity Grants), and the Coordination for the Improvement of Higher Education Personnel (CAPES), through a doctoral scholarship process No. 88887.980176/2024-00. The study also had the institutional support of the Federal University of Santa Catarina (UFSC).

Declaration of Conflict of Interest

Nothing to declare.

Declaration of Data Availability

No databases were generated in this study. The information presented is described in the body of the article.

Authorship Criteria (Author Contributions)

Patrícia Kuerten Rocha 1. contributed substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical review and final approval of the published version.

Amanda Ullman 1. contributed substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical review and final approval of the published version.

Luciano Marques dos Santos 1. contributed substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical review and final approval of the published version.

Thiago Lopes da Silva 1. Contributes substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical review and final approval of the published version.

Jefferson Wildes da Silva Moura 1. Contributes substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical review and final approval of the published version.

Sayonara Stéfane Tavares de Moura 1. Contributes substantially to the conception and/or planning of the study; 2. to the acquisition, analysis, and/or interpretation of the data; 3. as well as to the writing and/or critical

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review and final approval of the published version.

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