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REVIEW PROTOCOL

Maintenance of the neonatal peripherally inserted central catheter: a scoping review protocol

Manutenção do cateter central de inserção periférica neonatal: protocolo de revisão de escopo

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ABSTRACT

Objective: To map and synthesize the evidence regarding the care provided by nurses for the maintenance of neonatal peripherally inserted central catheters. **Method:** The protocol was developed following the Joanna Briggs Institute (JBI) recommendations, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines. The scoping review will describe and map the scientific evidence of maintaining neonatal peripherally inserted central catheters from the national and international literature.
Descriptors: Nursing Care; Infant, Newborn; Catheterization, Peripheral.

RESUMO

Objetivo: Mapear e sintetizar as evidências sobre os cuidados realizados por enfermeiros para a manutenção do cateter central de inserção periférica neonatal. **Método:** O protocolo foi construído seguindo as recomendações do Instituto Joanna Briggs (JBI), atendendo às diretrizes *Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews* (PRISMA-ScR). A revisão de escopo descreverá e mapeará as evidências científicas relativas à manutenção do cateter central de inserção periférica neonatal presentes nas literaturas nacionais e internacionais.
Descritores: Cuidados de Enfermagem; Recém-Nascido; Cateterismo Periférico.

INTRODUCTION

Qualified nurses or physicians perform the peripherally inserted central catheter (PICC) with the necessary training, expertise, knowledge, and technical proficiency for catheter insertion. This catheter is introduced through a peripheral vein puncture, with central positioning, meaning that the distal tip should reside within the superior or inferior vena cava, depending on the chosen limb[1-8].

The utilization of PICCs expanded during the 1980s, driven by catheter improvements. Its initial application occurred in neonatal Intensive Care Units (ICUs), and its success permeated various hospital departments[4,8,10-11]. The country's records indicate its use since 1990 in neonatal, pediatric, intensive care, oncology, and extended care areas (5-6,8). Regulation only occurred in 2001 through Resolution No. 258/2001 from the Federal Nursing Council (COFEN), wherein nursing professionals are empowered with technical and legal responsibility for PICC insertion and maintenance[11-13].

The PICC technology offers numerous advantages for neonates, allowing extended dwell times and administering highly vesicant and irritating drugs without causing tissue or vessel injury in these newborns. This contributes to reducing pain for the infant and stress for their family while minimizing the number of punctures[1-2,4-6,8-9].

Nevertheless, these devices are not exempt from complications and associated risks if proper catheter care is not observed, including bloodstream infections, ruptures, thrombosis, and obstructions[2-3,4-10].

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The occurrence rate of these complications can range from 13% to 50.7%, with infection being the most frequent[3-4-8-10].

In this context, insertion is an exclusive task for nurses or physicians with the required technical competence due to the procedure's specificity. It demands clinical decision-making and judgments to ensure effective outcomes[9,11]. The nurse's role is vital in critically assessing the necessity for insertion, maintenance, and evaluation of the catheter.

The care and measures adopted for PICC maintenance aim to identify risks from device usage, intending to deliver excellent, harm-free patient care and achieve treatment success[5-6,9].

Hospitalization of neonates in an intensive care unit presupposes potentially prolonged stays and severity, necessitating numerous intravenous therapies, especially for preterm neonates. PICCs have facilitated the reduction of complications arising from difficulties in venous access due to multiple peripheral punctures and procedural failures, enabling essential intravenous therapies to recover hospitalized neonates' health.

Given the responsibility for conscious, safe, and effective decision-making by healthcare professionals, infusion therapy requires innovations derived from professional practice, particularly evidence-based nursing, to positively impact the quality of care indicators[14].

Within this context, gaps in knowledge are evident in the scientific evidence concerning this topic. A search was conducted on October 1, 2021, across PubMed, the Joanna Briggs Institute (JBI), The JBI Database of Systematic Reviews and Implementation Reports (PRISMA-ScR), and The International Prospective Register of Systematic Reviews (PROSPERO), revealing a lack of reviews or review protocols addressing neonatal peripherally inserted central catheter maintenance.

Therefore, this study aims to map and synthesize the evidence regarding the care provided by nurses for the maintenance of neonatal peripherally inserted central catheters.

METHOD

Study design

This study concerns the construction of a protocol for conducting a scoping review study to explore the depth of literature on the subject, emphasizing theories, sources of evidence, concepts, and research gaps[15]. The scoping review will be developed following the methodological recommendations of JBI, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist[15-16]. The literature recommends a five-step process: 1) identification of the research question; 2) identification of relevant studies; 3) study selection; 4) data analysis; and 5) data grouping, synthesis, and presentation[16]. The protocol has been registered in the Open Science Framework (OSF) under the DOI identifier 10.17605/OSF.IO/BM3TN, available on the website: https://osf.io/bm3tn/?view_only=9b213d7e6cff47779449863435e5de62.

The PCC acronym (Population, Concept, and Context) proposed by JBI will be utilized, as depicted in Figure 1, and adjusted to the review's objectives to address the guiding question and study objective. For database searches, the following Health Science Descriptors (DeCS) will be employed: "nursing care," "newborn," "peripheral catheterization," and "central venous catheterization" in Portuguese, English, and Spanish languages, combined according to their synonyms and search strategy for each database using the Boolean operators "AND" and "OR".

Acronym	Descriptors
Population (P)	Nurses, Newborns
Concept (C)	Studies that address PICC maintenance in newborns
Context (C)	PICC care and maintenance measures in newborns

Figure 1 - Acronym strategy used in the study. Londrina, PR, Brazil, 2023

Preparation of the guiding question

What are the care and/or measures adopted by nurses for the maintenance of PICCs in newborns, as available in the literature?

Original scientific articles, case reports, technical notes, theses, and dissertations available in electronic publications on the databases PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Scopus, Latin American and Caribbean Health Sciences Literature (LILACS), Embase, Cochrane Library, Google Scholar, and Scientific Electronic Library Online (Scielo), as well as gray literature (theses and dissertations) through the Virtual Health Library Portal (VHL), the Latin American Theses and Dissertations Portal, and the Catalog of Theses and Dissertations from the Coordination for the Improvement of Higher Education Personnel (CAPES), will be included if they address the objective and research question. Studies focusing on newborns and care and/or measures for PICC maintenance will be considered in Portuguese, English, and Spanish from 2017 to 2022 to determine the updated measures adopted by nurses for the maintenance of PICCs in newborns, as available in the literature. This time frame was chosen to account for the regulation and utilization of PICCs in Brazil and ensure that the studies are freely accessible in electronic format.

Advertising announcements, editorials, opinion articles, articles published in proceedings, and editor letters will be excluded. Upon full-text reading, studies that do not address the research question and duplicated studies will be counted only once.

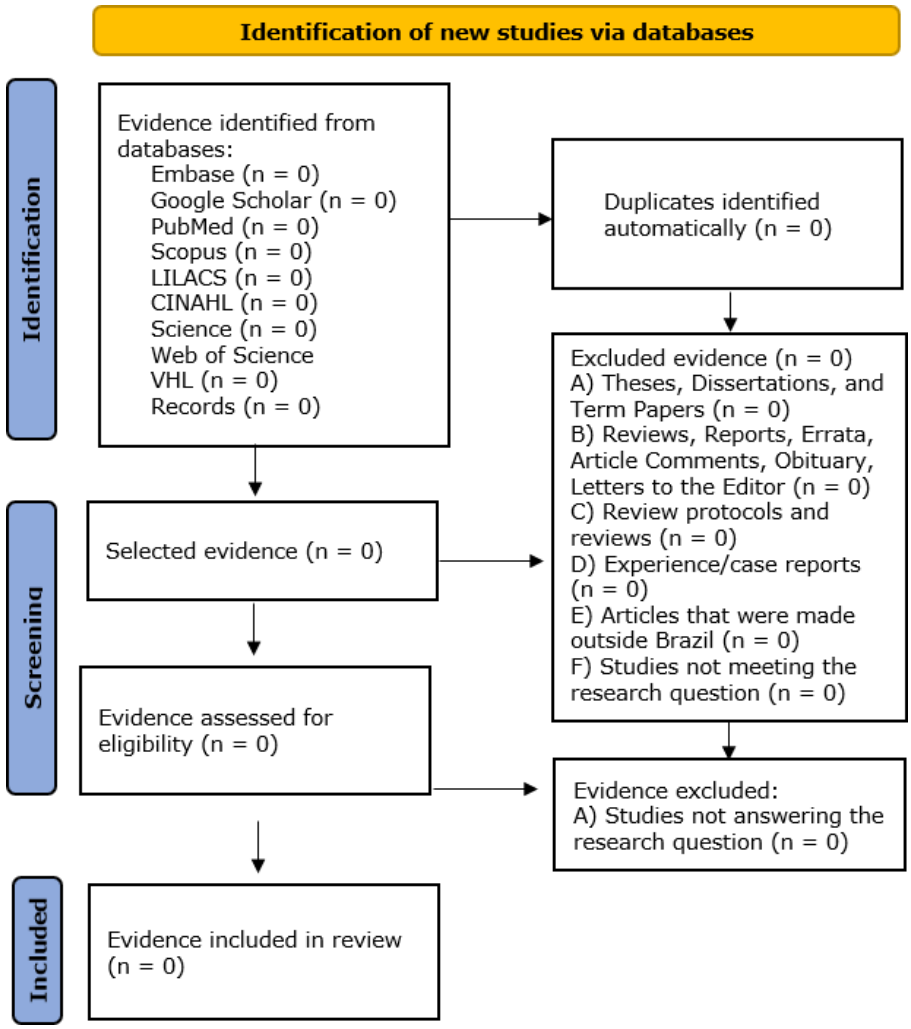
Search strategy

The searches will be conducted in the following databases: Embase, Google Scholar, PubMed, Scopus, LILACS, CINAHL, Scielo, Web of Science, and VHL (Virtual Health Library). For each database, a search strategy will be implemented. DeCS (Health Sciences Descriptors), MeSH (Medical Subject Headings), and CINAHL Headings will be employed as descriptors.

Following the database search method, the articles will be exported to EndNote Online, a reference manager used to standardize the acceptable file format for systematic review management. Subsequently, the State of the Art through Systematic Review (StArt) software will be adopted to manage the review stages. This software was developed by the Software Engineering Research Laboratory (LaPes) at the Federal University of São Carlos (UFSCAR) and is free of charge. With this, evidence will be flagged for duplications, facilitating the management of the resulting quantity for both preliminary and full-text readings.

To ensure the reliability of this scoping review process and mitigate research bias, article selection and reading will be performed independently by two reviewers, with a third reviewer involved in cases of disagreement, adhering to the inclusion criteria and research question.

This procedure will be presented under the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P), divided into six steps: search, exclusion of duplicates, selection of study phases (title, abstract and full text), justification for exclusion, reading, and inclusion of studies, as shown in Figure 2.



Fonte: PRISMA flow diagram adapted from Page et al., 2020.
Figure 2 - Identification of new studies through databases. Londrina, PR, Brazil, 2023

Two independent researchers will conduct the readings. A data extraction form aligned with the objective and research question will be developed to facilitate the process. It is worth noting that, initially, a pilot test of this instrument will be conducted, involving the random reading of 10 articles to identify any flaws and/or potential modifications in the form.

The title, abstract, and keywords will be reviewed in the first stage. In the second stage, a full-text reading will be conducted. In cases where there is a discrepancy between the two researchers, a third reviewer will make the final judgment regarding the inclusion or exclusion of the scientific evidence.

CONFLICT OF INTERESTS

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

REFERENCES

1. Gordon A, Greenhalgh M, McGuire W. Early planned removal versus expectant management of peripherally inserted central catheters to prevent infection in newborn infants. Cochrane Data Base Syst Rev. 2018;6(6):CD012141. https://doi.org/10.1002/14651858.cd012141.pub2
2. Silveira TVL, Madeira LM, Rigo FL, Cunha AC, Costa MF, Camponêz PSP, et al. Complicações decorrentes do uso do cateter central de inserção periférica (PICC) em uma unidade de terapia intensiva neonatal. Braz J Develop. 2021;7(10):95180–95191. https://doi.org/10.34117/bjdv7n10-027
3. Bomfim JMS, Passos LS, Santos FS, Santos LH, Silva JC. Desafios na manutenção do cateter central de inserção periférica em neonatos. Cuid Enferm [Internet]. 2019 [cited 2023 Feb 03];13(2):174-179. Available from: https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1087640
4. Barros FCA, Santos SC, Jordão CC. Ações do enfermeiro na prevenção de infecção por cateter central de inserção periférica em unidade de terapia intensiva neonatal F. Saúde e Ciência em Ação [internet]. 2019 [cited 2023 Feb 02];5(1):54-62. Available from: https://revistas.unifan.edu.br/index.php/RevistaICS/article/view/515/409
5. Leite AC, Silva LA, Silva MPB, Silva ML, Alves RSS, Gomes BP, et al. Atuação do enfermeiro no manuseio do cateter venoso central de inserção Periférica em Unidade de Terapia Intensiva Neonatal. Res Soc Dev. 2021;10(2):e59010212974. https://doi.org/10.33448/rsd-v10i2.12974
6. Prado NCDC, Santos RSDC, Limbelea DMD, Góis MMDCD, Costa RHS, Silva RARD. Necessidades humanas básicas alteradas em neonatos com cateter central de inserção periférica. Rev Enferm UERJ. 2019;27:e44521-e44521. http://dx.doi.org/10.12957/reuerj.2019.44521
7. Braga LM, Salgueiro-Oliveira AS, Henriques MAP, Arreguy-Sena C, Albergaria VMP, Parreira PMSD. Cateterismo venoso periférico: compreensão e avaliação das práticas de enfermagem. Texto Contexto Enferm. 2019;28:e20180018. http://dx.doi.org/10.1590/1980-265X-TCE-2018-0018
8. Pereira HP, Makuch DMV, Freitas JS, Secco IL, Danski MTR. Cateter central de inserção periférica: práticas de enfermeiros na atenção intensiva neonatal. Enferm Foco. 2020;11(4):188-193. https://doi.org/10.21675/2357-707X.2020.v11.n3.3193
9. Ferreira LA, Magalhães FJ, Rolim KMC, Silva FEJA, Silva WPG, Sampaio RG, et al. Intervenções de Enfermagem no uso do PICC em pediatria e neonatologia: evidências científicas. Atas CIAIQ [Internet]. 2018 [cited 2020 Apr 30];2. Available from: https://proceedings.ciaiq.org/index.php/ciaiq2018/article/view/1926
10. Silva IMF, Silva MAXM, Barbosa GLP. Infecção de corrente sanguínea associada ao uso de picc em neonatos: conhecimento de graduandos de enfermagem sobre os fatores relacionados e estratégias utilizadas para a prevenção. REASE. 2021;7(11):514-559. http://dx.doi.org/10.51891/rease.v7i11.3089
11. De Luca FR, Selegatto G, Monteiro M, Santos NT, Rodrigues C, Lima IM, et al. Implantação do programa "paciente no centro do cuidado" na prevenção de infecção de corrente sanguínea relacionada ao cateter de longa duração. Braz J Infect Dis. 2022;26(S2):102521. https://doi.org/10.1016/j.bjid.2022.102520
12. Beleza LO, Ribeiro LM, Vasques CI, Margatha A, Brasil G, Costa K. Atualização das recomendações da prática quanto ao cateter central de inserção periférica em recém-nascidos. Rev Enferm UERJ. 2021;29(1):61291. http://dx.doi.org/10.12957/reuerj.2021.61291
13. Conselho Federal de Enfermagem (BR). Parecer técnico COREN-DF n° 010/2022. Competências da equipe de enfermagem no manejo do Cateter Central de Inserção Periférica (PICC) [Internet]. Brasília (D): COREN; 2022 [cited 2023 Apr 19]. Available from: https://coren-df.gov.br/site/wp-content/uploads/2022/03/pt102022.pdf
14. Sá Neto JA, Silva AR, Knupp VMAO, Barcia LLC, Barreto ACM. Conhecimento de enfermeiros acerca do cateter central de inserção periférica: realidade local e desafios globais. Rev Enferm UERJ. 2018;26:e33181. https://doi.org/10.12957/reuerj.2018.33181

15. Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil, H. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z, editors. JBI Manual for Evidence Synthesis [Internet]. Adelaide: JBI; 2020 [cited 2022 Jan 23]. Available from: https://synthesismanual.jbi.global

16. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018;169(7):467-473. https://doi.org/10.7326/M18-0850

17. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ. 2021;372(71). https://doi.org/10.1136/bmj.n71

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