Cateteres centrais de inserção periférica em neonatologia: uma revisão integrativa da literatura sobre utilização, manejo e complicações

Peripherally Inserted Central Catheters in Neonatology: An Integrative Literature Review Addressing Use, Management, and Complications

Cateteres centrais de inserção periférica em neonatologia: una revisión integrativa de la literatura sobre utilización, manejo y complicaciones

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REVISA

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RESUMO

Objetivo: analisar as evidências científicas disponíveis sobre a utilização, manejo e complicações do Cateter Central de Inserção Periférica (PICC) em neonatologia. Método: trata-se de uma Revisão Integrativa da Literatura, conduzida nas bases de dados MEDLINE/PubMed, LILACS, BDENF e SciELO, por meio dos descritores "cateterismo periférico" AND "neonatologia". A busca foi realizada em junho de 2026, sem recorte temporal, incluindo estudos disponíveis na íntegra, em língua portuguesa, que abordassem a temática proposta. Após aplicação dos critérios de elegibilidade, foram selecionados 12 estudos para análise. A análise dos dados seguiu a técnica de análise de conteúdo de Bardin, permitindo a organização dos achados em seis categorias temáticas. **Resultados:** os estudos evidenciaram que o PICC é amplamente utilizado em recém-nascidos prematuros e de baixo peso, sendo indicado principalmente para nutrição parenteral e terapias intravenosas prolongadas. Identificaram-se como principais complicações as infecções da corrente sanguínea associadas ao cateter, obstruções, flebites e eventos mecânicos, como extravasamento e posicionamento inadequado. Evidenciou-se que a padronização de práticas assistenciais e a implementação de protocolos reduzem significativamente as complicações, especialmente infecciosas. Além disso, destacou-se o papel central do enfermeiro no manejo do dispositivo, sendo o conhecimento técnico-científico e a capacitação contínua fatores determinantes para a segurança do paciente. **Conclusão:** o PICC configura-se como tecnologia essencial na terapia intravenosa neonatal, porém seu uso seguro depende diretamente da qualificação profissional, da adesão a protocolos assistenciais e da capacitação contínua das equipes de enfermagem, elementos fundamentais para a redução de complicações e a qualificação da assistência
Descritores: Cateterismo periférico; Neonatologia; Unidade de Terapia Intensiva Neonatal.

ABSTRACT

Objective: To analyze the available scientific evidence regarding the use, management, and complications of Peripherally Inserted Central Catheters (PICCs) in neonatology. Method: This is an integrative literature review conducted in the MEDLINE/PubMed, LILACS, BDENF, and SciELO databases using the descriptors "peripheral catheterization" AND "neonatology". The search was performed in June 2026, with no time restriction, including full-text studies published in Portuguese that addressed the proposed topic. After applying the eligibility criteria, 12 studies were selected for analysis. Data analysis was performed using Bardin's content analysis technique, allowing the organization of findings into six thematic categories. **Results**: The studies demonstrated that PICCs are widely used in premature and low birth weight newborns, being primarily indicated for parenteral nutrition and prolonged intravenous therapies. The main complications identified were catheter-related bloodstream infections, obstructions, phlebitis, and mechanical complications, such as extravasation and catheter malposition. The standardization of care practices and implementation of protocols were shown to significantly reduce complications, particularly infectious complications. Furthermore, the central role of nurses in device management was highlighted, with technical-scientific knowledge and continuous professional training identified as determining factors for patient safety. **Conclusion**: PICCs represent an essential technology in neonatal intravenous therapy; however, their safe use depends directly on professional qualification, adherence to care protocols, and continuous training of nursing teams. These elements are fundamental for reducing complications and improving the quality of care.

Descriptors: Peripheral Catheterization; Neonatology; Intensive Care Units.

RESUMEN

Objetivo: analizar las evidencias científicas disponibles sobre la utilización, manejo y complicaciones del Cateter Central de Inserção Periférica (PICC) en neonatología. Método: trata-se de una Revisão Integrativa da Literatura, conduzida nas bases de datos MEDLINE/PubMed, LILACS, BDENF e SciELO, por meio dos descripciones "cateterismo periférico" AND "neonatologia". A busca foi realizada em junio de 2026, sin recorte temporal, incluyendo estudios disponibles na íntegra, en lengua portuguesa, que aborda una propuesta temática. Después de la aplicación de los criterios de elegibilidad, se seleccionan 12 estudios para analizarlos. A análise dos dados seguiu a técnica de análise de conteúdo de Bardin, permitindo a organização dos achados em seis categorías temáticas. Resultados: los estudios evidenciaron que el PICC se utiliza ampliamente en recién nacidos prematuros y de bajo peso, sendo indicado principalmente para nutrición parenteral y terapias intravenosas prolongadas. Identificamos como principales complicaciones como infecciones de corriente sanguínea asociadas al cateter, obstrucciones, flebites y eventos mecánicos, como extravasamento y posición inadecuada. Evidenciou-se que la padronización de prácticas asistenciales y la implementación de protocolos reducen significativamente las complicaciones, especialmente infecciosas. Además, destacou-se o papel central do enfermeiro no maneja do dispositivo, sendo o conhecimento técnico-científico e a capacitação contínua fatores determinantes para a segurança do paciente. Conclusión: El PICC se configura como tecnología esencial en la terapia intravenosa neonatal, por lo que su uso depende directamente de la calificación profesional, del cumplimiento de los protocolos de asistencia y de la capacitación continua de los equipos de enfermagem, elementos fundamentales para la reducción de complicaciones y la calificación de asistencia.
Descriptores: Cateterismo periférico; Neonatología; Unidade de Terapia Intensiva Neonatal.s.

REVISÃO

Introduction

The Peripherally Inserted Central Catheter (PICC) is a vascular device widely used in neonatal intensive care units, particularly indicated for premature or clinically unstable newborns requiring prolonged intravenous therapy. It involves venous access inserted into peripheral veins with the tip positioned in central vessels, allowing for the safe administration of irritating or vesicant solutions, parenteral nutrition, and continuous medications, while reducing the need for repeated venipunctures[1].

In recent decades, advancements in intravenous therapy technologies have expanded the use of PICCs in neonatal care, establishing them as a significant alternative to conventional central venous catheters. However, despite the benefits associated with their use, implementation and maintenance require technical rigor, specialized knowledge, and adherence to well-established institutional protocols, particularly given the clinical vulnerability of the neonatal population[2].

Available studies indicate that the safety and efficacy of PICCs in neonatology are directly linked to the qualifications of the multiprofessional team—highlighting the role of nurses, especially regarding device insertion, maintenance, and monitoring. Furthermore, strategies such as the standardization of care practices, continuing education, and the adoption of evidence-based measures have been associated with reduced complications and improved clinical outcomes for newborns undergoing prolonged intravenous therapy[3].

Despite the widespread use of Peripherally Inserted Central Catheters (PICCs) in neonatal intensive care units, scientific literature still presents varied findings regarding their use, management, and associated complications. National and international studies address various aspects of the device—including clinical indications, insertion techniques, infection prevention, maintenance, and adverse events—yet this evidence remains fragmented, hindering the development of a comprehensive overview to guide clinical decision-making and enhance the quality of nursing care[4].

Furthermore, the increasing use of PICCs in neonatal care necessitates continuous professional updating and the adoption of evidence-based practices, particularly given the vulnerability of premature and low-birth-weight infants. In this context, identifying and synthesizing available evidence is crucial for understanding factors related to device safety, major complications, and strategies to enhance the quality of care[1].

Given this gap in the systematization of knowledge, the following guiding question arises: what scientific evidence is available regarding the use, management, and complications associated with Peripherally Inserted Central Catheters (PICCs) in neonatology? Thus, this integrative review aims to analyze and synthesize scientific evidence on PICC use, management, and complications in newborns, thereby contributing to the strengthening of evidence-based practice and the improvement of neonatal care quality.

Methodology

O This study is characterized as qualitative research of a descriptive nature, conducted using the Integrative Literature Review (ILR) method. The ILR is a methodological strategy widely used in the healthcare field, as it enables a comprehensive and systematic synthesis of knowledge regarding a specific topic by integrating results from studies with diverse methodological designs[4].

The review process followed the stages proposed by Whittemore and Knafl, comprising: (1) problem identification and formulation of the guiding question; (2) literature search and definition of the sampling strategy; (3) critical appraisal of the included studies; (4) data analysis and interpretation; and (5) presentation of the review. Rigor in conducting these stages was essential to ensure the reliability, validity, and reproducibility of the finding[5].

The research's guiding question was formulated based on the PICo strategy (Population, Interest, and Context), which aids in delimiting the research focus and defining appropriate descriptors for the bibliographic search. Thus, the following question was established: "What scientific evidence is available regarding the use, management, and complications of peripherally inserted central catheters in neonatology?" Accordingly, the following parameters were defined: P = newborns using a peripherally inserted central catheter; I = use, management, and complications of the PICC; Co = neonatology in neonatal intensive care units.

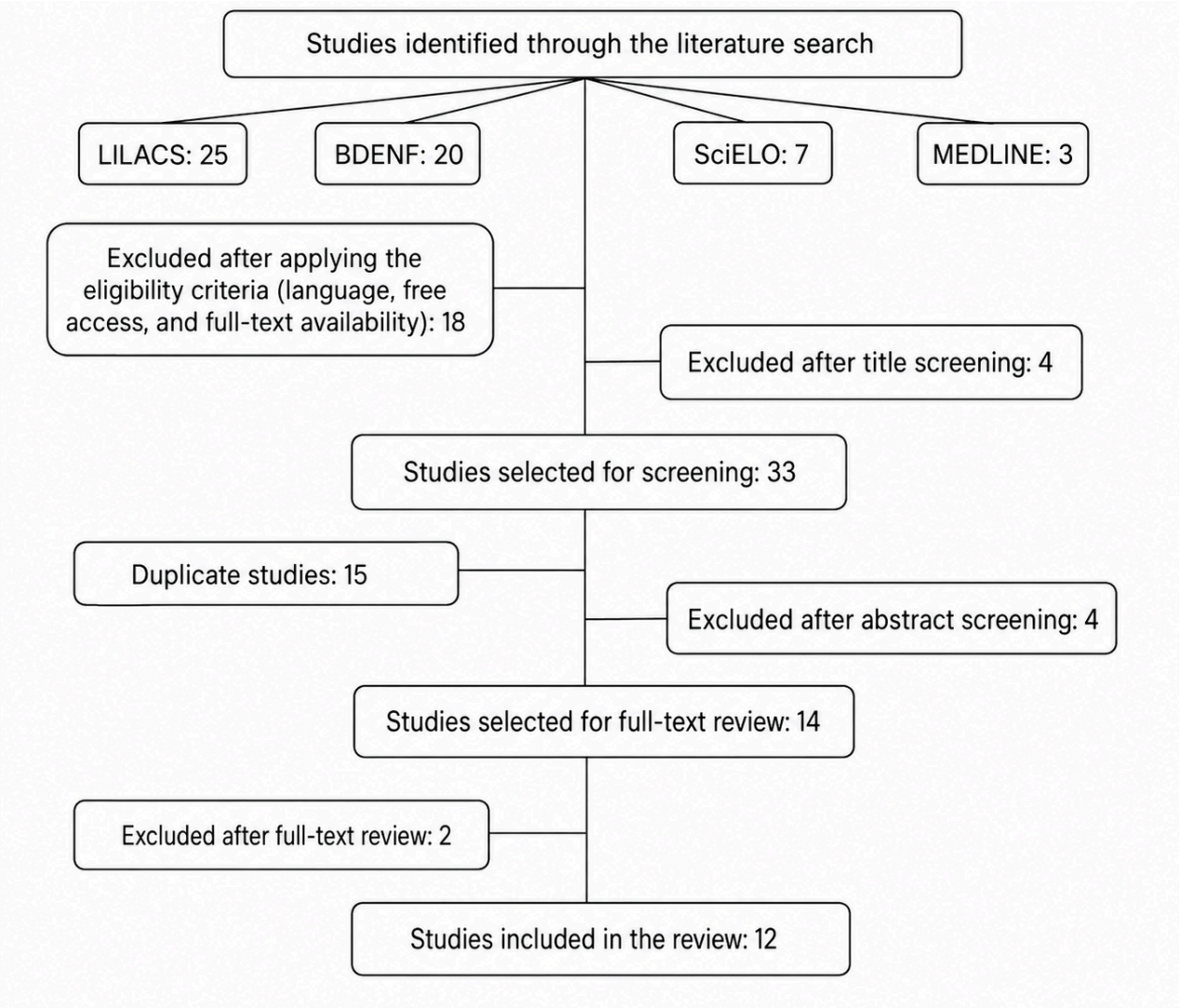
To identify the studies, searches were conducted in the following electronic databases: Medical Literature Analysis and Retrieval System Online (MEDLINE/PubMed), Latin American and Caribbean Health Sciences Literature (LILACS), Nursing Database (BDENF), and Scientific Electronic Library Online (SciELO). The search strategy was structured using controlled descriptors combined via the Boolean operator "AND," utilizing the terms: "peripheral catheterization" AND "neonatology."

Data collection was conducted in June 2026, adopting the following inclusion criteria: studies available in full text with free access, published in Portuguese, with no established time frame, and addressing the use, management, or complications of peripherally inserted central catheters in neonatology. Studies duplicated across databases, publications in other languages, studies unavailable in full text, and those that did not address the guiding question were excluded.

The study selection process involved initially reading titles and abstracts, followed by a full-text review of eligible articles, ensuring greater precision in including works relevant to the study topic.

The study selection process was systematized and organized into a flowchart, as shown in Figure 1, which illustrates all stages of the identification, screening, eligibility, and inclusion process.

Figure I – Study selection process flowchart



Source: Study authors, 2026.

Data analysis employed the content analysis technique proposed by Bardin, organized into three phases: (1) pre-analysis, involving a preliminary reading and organization of the material; (2) material exploration, involving data coding and categorization; and (3) treatment of results, involving inference and interpretation of the findings. This approach enabled the identification of thematic categories related to the use, management, and complications of peripherally inserted central catheters in neonatology[6].

It is also noted that, during the drafting and linguistic revision of this study, artificial intelligence (ChatGPT version 5.5) was used to enhance clarity, textual cohesion, and grammatical accuracy; this usage did not interfere with study selection, data analysis, or the interpretation of results, and the researchers retained full authorship and responsibility for the scientific content produced.

Results and Discussion

Initially, fifty-five studies were identified in the databases by applying advanced search filters based on the selected descriptors and the Boolean operator. Study selection was conducted by applying inclusion and exclusion criteria through a full-text review; studies were excluded due to duplication, failure to address the guiding question, or failure to meet defined methodological criteria, resulting in the inclusion of twelve eligible studies in the review.

Based on the findings, six categories emerged: (1) Use of the Peripherally Inserted Central Catheter (PICC) and the clinical profile of neonatal and pediatric patients; (2) Insertion, technique, and management of the PICC; (3) Complications associated with PICC use in neonatology and pediatrics; (4) Infection prevention and standardization of care practices; (5) Nurses' knowledge, training, and practice regarding PICC care; and (6) Educational technologies, innovation, and strategies for improving the quality of care.

Category 1 – Use of Peripherally Inserted Central Catheters and clinical profile of neonatal and pediatric patients

The studies analyzed demonstrate that the Peripherally Inserted Central Catheter (PICC) is widely used in neonatal and pediatric intensive care units, particularly as a strategy for safe venous access in patients with complex clinical conditions. Its use predominates among premature newborns with low birth weight and a gestational age of less than 32 weeks, reflecting the vulnerability of this population and the need for safe, prolonged intravenous therapies[7].

In this context, the device's primary indication is the administration of total parenteral nutrition, antibiotics, and irritating or vesicant medications; the PICC is considered an essential alternative for preserving these patients' venous integrity. Studies indicate that its use is directly associated with the need for medium- to long-term therapies, especially in clinically unstable neonates for whom conventional peripheral venous access is limited or unfeasible[8].

Additionally, the literature shows that catheter insertion patterns reveal a predominance of veins with larger diameters and greater hemodynamic stability, with the basilic vein standing out as one of the most frequently used sites. The choice of insertion site is linked to anatomical ease, a higher procedure success rate, and a lower risk of mechanical complications during catheter advancement to the central position[9].

Findings also indicate that the duration of PICC use in neonates typically ranges from approximately two to seven weeks, depending on the therapeutic indication and the absence of complications. Various studies show that a significant proportion of catheters remain in place until hospital discharge, reinforcing their role in ensuring continuity of care and reducing the need for multiple venipunctures1. In this context, the results demonstrate that the use of PICCs in neonatology and pediatrics is not limited to their technical function but is also associated with improved quality of care, as it reduces patient stress, decreases the number of repetitive invasive procedures, and contributes to greater clinical stability during treatment[10].

Category 2 – Insertion, technique, and management of the Peripherally Inserted Central Catheter (PICC)

The analyzed literature demonstrates that the insertion and management of Peripherally Inserted Central Catheters (PICC) in neonatology and pediatrics require technical rigor, standardized procedures, and specialized knowledge from the nursing team; these factors are determinants of procedural success and the reduction of associated complications. The insertion process involves critical steps—such as appropriate vein selection, correct measurement of catheter length, and proper positioning of the tip in a central location—which are directly related to the safety and efficacy of intravenous therapy[11].

Studies also emphasize that proper PICC management includes essential maintenance practices, such as strict aseptic technique during handling, proper hand hygiene, the use of maximal barrier precautions during insertion and dressing changes, and flushing the catheter with saline solution before and after medication infusions. These measures are considered fundamental to ensuring device patency and reducing adverse events[12].

Furthermore, safe catheter maintenance depends on the standardization of institutional protocols and the performance of trained teams—particularly specialized catheter teams—which contribute to the uniformity of practices and continuous monitoring of the device. A lack of standardization or failure to adhere to technical steps is associated with a higher risk of complications, reinforcing the need to systematize the work process[13].

Another relevant aspect identified in the studies concerns the central role of nursing staff throughout all stages of the process, from insertion to maintenance and removal of the PICC. In this regard, professional qualification is highlighted as an essential element, as technical-scientific mastery of the procedure directly influences clinical outcomes, particularly in neonatal populations, which exhibit greater vascular and clinical fragility[14].

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Category 3 – Complications associated with the use of Peripherally Inserted Central Catheters in neonatology and pediatrics

The studies analyzed demonstrate that, although the Peripherally Inserted Central Catheter (PICC) is recognized as a safe and effective alternative for prolonged intravenous therapy, its use is not free from complications. Evidence indicates that adverse events related to the device can be infectious, mechanical, or thrombotic in nature, directly impacting treatment continuity, length of hospital stay, and the safety of neonatal and pediatric patients[15].

Among the most frequently reported complications, catheter-related infections—particularly PICC-associated bloodstream infections—stand out. Studies reveal that the occurrence of these infections remains a major challenge for healthcare teams, given that newborns, especially premature and very low birth weight infants, exhibit immunological immaturity and heightened susceptibility to infectious processes. Furthermore, procedure-related factors—such as the vessel accessed, catheter tip

positioning, and device maintenance conditions—have been identified as potential determinants for the development of these infections[16].

In addition to infectious complications, studies highlight the occurrence of mechanical events associated with catheter use. Notable examples include obstruction, rupture, extravasation, accidental dislodgement, failure of the catheter to advance during insertion, and improper tip positioning. Such complications can compromise device functionality, necessitate early removal, and expose the patient to the need for additional venous punctures, thereby increasing the risk of adverse events and clinical discomfort[2].

Another recurring theme in the literature concerns inflammatory and vascular complications, such as chemical, mechanical, and bacterial phlebitis, as well as thrombosis. Although less frequent than infections and obstructions, these complications represent significant causes of therapeutic failure and unplanned device removal. In neonatal patients, such complications are of even greater significance due to the vascular fragility characteristic of this population, requiring continuous monitoring and early intervention at the first clinical signs[7].

The findings also demonstrate that a significant proportion of complications is related to the quality of catheter management. Studies evaluating the implementation of clinical guidelines and educational interventions have observed a marked reduction in infection rates and systemic events associated with PICCs, highlighting that many complications can be prevented through the adoption of evidence-based care practices. Thus, the occurrence of adverse events should not be viewed merely as an inherent consequence of using the device, but also as a reflection of organizational conditions, staff training, and adherence to institutional protocols[10].

Category 4 – Infection prevention and standardization of care practices

The studies analyzed demonstrate that preventing infections related to Peripherally Inserted Central Catheters (PICCs) is a major challenge in neonatal care, while also representing an area with significant potential for interventions to improve care quality. Given the vulnerability of newborns admitted to neonatal intensive care units—particularly premature and very low birth weight infants—adopting standardized care practices is a strategic approach to reducing infectious complications and enhancing safety during device use[17].

In this context, the literature highlights that implementing care protocols based on evidence-based findings contributes significantly to reducing catheter-related bloodstream infections. Studies show that systematizing the stages of PICC insertion, maintenance, and monitoring fosters consistent professional conduct, reduces practice variability, and strengthens the patient safety culture. Thus, standardizing care emerges as an essential strategy for minimizing errors and ensuring higher quality intravenous therapy[8,9].

The findings also underscore the importance of preventive measures during catheter insertion, such as using maximal barrier precautions, performing proper skin antisepsis, carefully selecting the insertion site, and confirming correct device tip placement. These practices are widely recognized as interventions capable of reducing microbial colonization and, consequently, lowering the risk of catheter-associated infection. Furthermore, studies emphasize that rigorous monitoring of the procedure by trained professionals facilitates the early identification of risk factors and enhances safety during execution[15].

Regarding PICC maintenance, hand hygiene, the use of aseptic technique during device manipulation, proper dressing management, and periodic catheter flushing with

saline solution stand out as the measures most frequently cited in the literature. Such measures are considered fundamental for preserving venous access integrity and preventing healthcare-associated infections. Consistent adherence to these practices has a direct impact on reducing adverse events and safely extending catheter dwell time[18].

Another relevant aspect identified in the studies concerns the role of specialized catheter teams and the organization of work processes in neonatal units. Evidence shows that trained teams responsible for the systematic monitoring of devices achieve better clinical outcomes, including reduced rates of catheter-related bloodstream infections. This specialized approach facilitates not only compliance with institutional protocols but also continuous surveillance of risk factors associated with the procedure and infusion therapy[19.]

Furthermore, studies evaluating educational interventions combined with the implementation of clinical guidelines have demonstrated significant results in reducing infectious complications. Staff capacity-building—through training, educational activities, and ongoing professional development—has proven capable of altering clinical practices and strengthening adherence to evidence-based recommendations. These results reinforce that infection prevention depends not only on the availability of technologies or material resources but also on continuous investment in the professional development of healthcare teams[20.]

Category 5 – Nurses' knowledge, training, and practice regarding PICC care

The analyzed studies demonstrate that nurses hold a central position in the process of inserting, maintaining, monitoring, and removing Peripherally Inserted Central Catheters (PICCs), playing a decisive role in the safety and effectiveness of intravenous therapy in neonatology. The literature shows that the quality of care provided is directly linked to the professional's technical-scientific knowledge, as proper management of the device requires mastery of the anatomical, physiological, clinical, and procedural aspects specific to this [technology8, 10.]

In light of this evidence, findings reveal that a nurse's knowledge regarding indications, contraindications, insertion techniques, catheter tip positioning, maintenance, and complication prevention is a key factor in newborn safety. Studies highlight that adequately trained professionals are better equipped to identify complications early, implement preventive measures, and ensure the safe continuity of intravenous therapy. Conversely, knowledge gaps can compromise care and increase the risk of device-related adverse events[7].

The literature also indicates that, despite the growing adoption of PICCs in neonatal services, limitations regarding professional qualifications persist. In some institutions, a significant proportion of nurses lacked formal certification for catheter insertion, while others struggled with fundamental aspects of the procedure, such as correctly locating the device tip and applying up-to-date technical recommendations. These findings suggest that the expanded use of PICCs is not always matched by equivalent investment in staff training, which can impact the quality of care provided[21].

Furthermore, studies emphasize that the nurse's role extends beyond the technical execution of procedures. These professionals are responsible for planning care, supervising the team, monitoring for signs of complications, educating family members, and promoting adherence to safe practices regarding the use of the device. This comprehensive approach contributes to the provision of care that is of higher quality, more humanized, and centered on the newborn's needs, particularly in high-acuity clinical settings[22].

In this context, continuing education emerges as a necessary strategy for strengthening professional competencies. Studies indicate that continuous capacity-building programs, periodic training, and updates based on protocols and scientific evidence enhance the team's knowledge and contribute to reducing PICC-related complications. Furthermore, these initiatives foster critical reflection on clinical practice and promote greater confidence in clinical decision-making[23].

Category 6 – Educational technologies, innovation, and strategies for enhancing care quality

The studies analyzed demonstrate that the incorporation of educational technologies and innovative professional development strategies has become a key tool for improving care related to Peripherally Inserted Central Catheters (PICC) in neonatology. Given the complexity of managing this device and the need for healthcare professionals to stay up-to-date, educational resources emerge as instruments that facilitate the acquisition and consolidation of technical-scientific knowledge essential for safe clinical practice[16].

In this context, the development and validation of educational technologies focused on PICC use in neonatal units stand out. Studies show that creating structured educational materials—grounded in scientific evidence and evaluated by subject-matter experts—helps disseminate current information on catheter insertion, maintenance, and the prevention of complications. Validating these resources reinforces their reliability and potential as tools to support clinical practice, thereby promoting standardized care procedures and enhancing patient safety[24].

Another relevant aspect identified in the studies is the positive impact of educational interventions on the quality of care. Research linking professional training to the implementation of clinical guidelines has observed a significant reduction in PICC-related complications, particularly catheter-associated bloodstream infections. These results demonstrate that investing in systematic educational processes directly affects clinical practice, fostering greater adherence to institutional protocols and strengthening the safety culture within healthcare services[25].

The literature also emphasizes that professional development strategies must go beyond one-off training sessions and instead constitute ongoing in-service education processes. Continuous professional updating is considered essential in light of the constant technological and scientific changes characterizing neonatal intravenous therapy. In this regard, continuing education enables not only the development of technical competencies but also the strengthening of professionals' critical and reflective capabilities when facing care-related challenges[26].

Conclusion

This integrative review identified and analyzed key scientific evidence regarding the use, management, and complications of Peripherally Inserted Central Catheters (PICC) in neonatology and pediatrics. Findings demonstrated that the PICC is an essential device for the care of newborns and children requiring prolonged intravenous therapy, particularly in situations involving the administration of parenteral nutrition, vesicant or irritant medications, or long-term treatments. Its use has contributed

significantly to preserving venous access, reducing the need for multiple punctures, and improving the quality of care provided.

However, studies showed that despite the benefits associated with PICC use, there are significant challenges regarding device insertion, maintenance, and monitoring. Complications such as bloodstream infections, occlusions, phlebitis, extravasation, rupture, and unplanned removal remain events that can compromise patient safety and the effectiveness of intravenous therapy. Consequently, the adoption of care protocols, infection prevention measures, continuous surveillance, and evidence-based practices has proven important for minimizing risks and enhancing the quality of care.

Another aspect widely highlighted in the literature is the strategic role of nurses throughout the PICC care process. The technical-scientific knowledge, practical skills, and decision-making abilities of these professionals directly influence care outcomes, underscoring the need for continuous investment in nursing staff training. Thus, professional competence emerges as a key factor in patient safety and the effectiveness of intravenous therapy, given the complexity of decisions involved in device insertion, maintenance, and assessment.

Furthermore, the relevance of educational strategies, educational technologies, and ongoing professional development processes is highlighted as fundamental to improving PICC-related care. Studies have shown that health education is a strategic tool for strengthening knowledge, developing technical skills, and promoting sustainable changes in clinical practice. The use of structured educational materials, expert-validated technologies, systematic training, and innovative teaching strategies has demonstrated the potential to foster the standardization of care practices, increase adherence to recommendations, and support professional decision-making regarding challenges associated with catheter management.

Therefore, this review highlights that professional development and the creation of educational strategies are essential components for establishing safe, evidence-based care in the context of PICC use in neonatology and pediatrics. It is recommended that healthcare institutions implement ongoing in-service education programs—combined with educational technologies and updated care protocols—as strategies to enhance professional practice, reduce device-related complications, and promote better clinical outcomes for pediatric and neonatal patients.

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References

1. Assis GLC, Mota ANB, Cesar VF, Turrini RNT, Ferreira LM. Direct cost of Peripherally Inserted Central Venous Catheter insertion by nurses in hospitalized adults. Rev Bras Enferm [Internet]. 2021;74(2):e20190663. https://doi.org/10.1590/0034-7167-2019-0663

2. Di Santo MK, Takemoto D, Nascimento RG, Nascimento AM, Siqueira É, Duarte CT, et al. Cateteres venosos centrais de inserção periférica: alternativa ou primeira escolha em acesso vascular?. J vasc bras [Internet]. 2017Apr;16(2):104–12. https://doi.org/10.1590/1677-5449.011516

3. Bortoli PSD, Leite ACAB, Alvarenga W de A, Alvarenga CS, Bessa CR, Nascimento LC. Cateter venoso central de inserção periférica em oncologia pediátrica: revisão de escopo. Acta paul enferm [Internet]. 2019Mar;32(2):220–8. https://doi.org/10.1590/1982-0194201900030

4. Amaral LR, Araújo CAS. Práticas avançadas e segurança do paciente: revisão integrativa da literatura. Acta Paul Enferm. 2018;31(6):688-95. https://doi.org/10.1590/1982-0194201800094

5. Whittemore R, Knafl K. The integrative review: updated methodology. J Adv Nurs. 2005;52(5):546-53. https://doi.org/10.1111/j.1365-2648.2005.03621

6. Valle PRD, Ferreira JDL. Análise de conteúdo na perspectiva de Bardin: contribuições e limitações para a pesquisa qualitativa em educação. Educ Rev. 2025;41:e49377. https://doi.org/10.1590/0102-469849377

7. Belo MPM, Silva RAM de C, Nogueira ILM, Mizoguti DP, Ventura CMU. Conhecimento de enfermeiros de Neonatologia acerca do Cateter Venoso Central de Inserção Periférica. Rev Bras Enferm [Internet]. 2012Jan;65(1):42–8. https://doi.org/10.1590/S0034-71672012000100006

8. Costa P, Camargo PP, Bueno M, Kimura AF. Dimensionamento da dor durante a instalação do cateter central de inserção periférica em neonatos. Acta Paulista De Enfermagem. 2010; 23(1), 35–40. https://doi.org/10.1590/S0103-21002010000100006

9. Di Santo MK, Takemoto D, Nascimento RG, Nascimento AM, Siqueira E, Duarte CT, et al. Cateteres venosos centrais de inserção periférica: alternativa ou primeira escolha em acesso vascular?. J vasc bras [Internet]. 2017Apr;16(2):104–12. https://doi.org/10.1590/1677-5449.011516

10. Rodrigues ZS, Chaves EMC, Cardoso MVLML. Atuação do enfermeiro no cuidado com o cateter central de inserção periférica no recém-nascido. Rev Bras Enferm [Internet]. 2006Sep;59(5):626–9. https://doi.org/10.1590/S0034-71672006000500006

11. Pinto LVD, Kaufmann GW, Giacomozzi CM, Sousa AC, Favero L. Eficácia das técnicas para reposicionamento de cateter central de inserção periférica em recém-nascidos. Cogitare Enferm [Internet]. 2025;30:e97191pt. https://doi.org/10.1590/ce.v30i0.97191pt

12. Dórea E, Castro TE de, Costa P, Kimura AF, Santos FG dos. Práticas de manejo do cateter central de inserção periférica em uma unidade neonatal. Rev Bras Enferm [Internet]. 2011Nov;64(6):997–1002. https://doi.org/10.1590/S0034-71672011000600002

13. Baiocco, G. G., & Silva, J. L. B. da . (2010). The Use of the Peripherally Inserted Central Catheter (Picc) in the Hospital Environment. Revista Latino-americana De Enfermagem, 18(6), 1131–1137. https://doi.org/10.1590/S0104-11692010000600013

14. Braga LM, Salgueiro-Oliveira A de S, Henriques MAP, Arreguy-Sena C, Albergaria VMP, Parreira PM dos SD. Peripheral venipuncture: comprehension and evaluation of nursing practices. Texto contexto - enferm [Internet]. 2019;28:e20180018. https://doi.org/10.1590/1980-265X-TCE-2018-0018

15. Souza MA, Lopes LC, Silva MT. Factors associated with complications related to the use of peripherally inserted central venous catheter in hospitalized children: a case-control study, Sorocaba, Brazil, 2018-2022. Epidemiol Serv Saúde [Internet]. 2025;34:e20240134. https://doi.org/10.1590/S2237-96222025v34e20240134.en

16. Silva DC, Guimarães CS, Stabile AM, Giroti SKO, Pieri FM, Gabriel CS, et al. Complications related to peripherally inserted central catheters in covid-19 patients and the potential of insertion technologies. Texto contexto - enferm [Internet]. 2024;33:e20230287. https://doi.org/10.1590/1980-265X-TCE-2023-0287en

17. Duarte ED, Pimenta AM, Silva BCN e, Paula CM de. Fatores associados à infecção pelo uso do cateter central de inserção periférica em Unidade de Terapia Intensiva Neonatal. Rev esc enferm USP [Internet]. 2013Jun;47(3):547–54. https://doi.org/10.1590/S0080-623420130000300004

18. Silva MPC, Bragato AG da C, Ferreira D de O, Zago LB, Toffano SEM, Nicolussi AC, et al. Bundle para manuseio do cateter central de inserção periférica em neonatos. Acta paul enferm [Internet]. 2019May;32(3):261–6. https://doi.org/10.1590/1982-0194201900036

19. Wosnes T dos R, Giacomozzi CM, Giacomozzi LM, Silva RPVC. Ensaio clínico randomizado controlado sobre o corte do cateter central de inserção periférica em neonatos. Cogitare Enferm [Internet]. 2022;27:e84798. https://doi.org/10.5380/ce.v27i0.84798

20. Lourenço SA, Ohara CV da S. Nurses' Knowledge about the Insertion Procedure for Peripherally Inserted Central Catheters in Newborns. Rev Latino-Am Enfermagem [Internet]. 2010Mar;18(2):189–95. https://doi.org/10.1590/S0104-11692010000200008

21. Silva ACSS, Santos EI, Queiroz PT, Góes FGB. O papel do enfermeiro com o cateter central de inserção periférica: revisão integrativa: The role of the nurse with the peripheral inserted central catheter: integrative review. Rev. Enferm. Atual In Derme [Internet]. 2019;82(20). https://doi.org/10.31011/reaid-2017-v.82-n.20-art.308

22. Johann DA, Lazzari LSMD, Pedrolo E, Mingorance P, Almeida TQR de, Danski MTR. Cuidados com cateter central de inserção periférica no neonato: revisão integrativa da literatura. Rev esc enferm USP [Internet]. 2012Dec;46(6):1503–11. https://doi.org/10.1590/S0080-62342012000600030

23. Oliveira CR, Neve ET, Rodrigues EC, Zamberlan KC, Silveira A. Cateter central de inserção periférica em pediatria e neonatologia: possibilidades de sistematização em hospital universitário. Esc Anna Nery [Internet]. 2014Jul;18(3):379–85. https://doi.org/10.5935/1414-8145.20140054

24. Menezes DN, Lima SL, Silva CK, Bentes LA. Validação de conteúdo de uma tecnologia sobre cateter de inserção periférica em unidades neonatais. Nursing Edição Brasileira [Internet]. 2026;26(300):9596-605. Disponível em: https://doi.org/10.36489/nursing.2023v26i300p9596-9605

25.Oliveira TGP, Marcatto JO, Corrêa ADR, Santos LMD, Rocha PK, Simão DADS, Manzo BF. Compliance with central venous catheter infection prevention practices after intervention with simulation. Rev Bras Enferm. 2023 Oct 9;76(4):e20220574. https://doi.org/10.1590/0034-7167-2022-0574

26. Souza S, Takashima M, August DRN, Biazus-Dalcin C, Silva TL, Bitencourt AS, Ullman A, Rocha PK. PiccPed® app impact on nurses' knowledge to prevent adverse events for peripherally inserted central catheters (PICC) in pediatric and neonatal healthcare: A quasi-experimental study. J Pediatr Nurs. 2024 Sep-Oct;78:112-117. https://doi.org/ 10.1016/j.pedn.2024.06.017

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