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Reflection

Nursing approaches to vascular access and infusion therapy: reflective study on advanced nursing practices

Enfermagem em acessos vasculares e terapia infusional: uma reflexão frente às práticas avançadas em enfermagem

Enfermería en accesos vasculares y terapia de infusión: reflexión sobre las prácticas avanzadas en enfermería

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Abstract

Objective: To explore Advanced Nursing Practice (ANP) perspectives on infusion therapy and vascular access management, considering educational, regulatory, and institutional challenges within the Brazilian context. **Methods**: A reflective study grounded in critical analysis of national and international scientific literature, current professional legislation, and the authors' expertise in infusion therapy. **Results**: The reflection highlighted significant technical and scientific advances in vascular access management, including modern devices and ultrasound-guided techniques. In countries with well-established ANP frameworks, nurses carry out high-complexity procedures with clinical and legal autonomy. In Brazil, despite occasional initiatives, nursing practice continues constrained by legal obstacles, insufficient education, and limited institutional acknowledgment. Without ANP regulations and institutional protocols, nurses' autonomy is limited, leading to poorer patient care outcomes. **Conclusion**: Positioning ANP as a strategic force in infusion therapy requires reviewing regulations, enhancing specialized training, and acknowledging nurses as strategic leaders in vascular care, aiming to promote patient safety and care excellence.

Descriptors: Advanced Nursing Practice; Vascular Access Devices; Nursing Undergraduate Programs; Education.

Whats is already known on this?
Research from international sources shows that advanced practice nurses play a key role in optimizing vascular access care in complex procedures. However, Brazil continues to encounter considerable legal and training barriers.

What this study adds?
The article provides a critical reflection on technological and scientific advances, alongside regulatory and educational challenges that hinder advanced practice as a strategic force in infusion therapy.

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Resumo

Objectivo: *Refletir sobre as perspectivas da Prática Avançada em Enfermagem (PAE) na área de terapia infusional e manejo de acessos vasculares, considerando os desafios formativos, normativos e institucionais no contexto brasileiro.* ***Método:*** *Estudo reflexivo fundamentado na análise crítica da literatura científica nacional e internacional, na legislação profissional vigente e na experiência dos autores com atuação em terapia infusional.* ***Resultados:*** *A reflexão permitiu identificar avanços técnico-científicos relevantes no cuidado com acessos vasculares, como o uso de dispositivos modernos e técnicas guiadas por ultrassom. Em países com modelos consolidados de PAE, observa-se que enfermeiros atuam com autonomia clínica e legal em procedimentos de alta complexidade. No Brasil, apesar de iniciativas pontuais, a atuação do enfermeiro permanece restrita por barreiras legais, formação fragilizada e baixo reconhecimento institucional. A ausência de regulamentação da PAE e de protocolos institucionais compromete a autonomia e o impacto no cuidado.* ***Conclusão:*** *A consolidação da PAE na terapia infusional requer revisão normativa, fortalecimento da formação especializada e valorização institucional do enfermeiro como protagonista estratégico no cuidado vascular, visando à segurança do paciente e à qualificação da assistência.*

Descritores: *Prática Avançada de Enfermagem; Dispositivos de Acesso Vascular; Programas de Graduação em Enfermagem; Educação.*

Resumén

Objetivo: *Reflexionar sobre las perspectivas de la Práctica Avanzada en Enfermería (PAE) en el área de la terapia de infusión y el manejo de dispositivos de acceso vascular, teniendo en cuenta los retos formativos, normativos e institucionales en el contexto brasileño.* ***Métodos:*** *Estudio reflexivo basado en el análisis crítico de la literatura científica nacional e internacional, la legislación profesional vigente y la experiencia de los autores en el ámbito de la terapia de infusión.* ***Resultados:*** *La reflexión permitió identificar avances técnico-científicos relevantes en el cuidado de los accesos vasculares, como el uso de dispositivos modernos y técnicas guiadas por ultrasonido. En países con modelos consolidados de PAE, se observa que los enfermeros actúan con autonomía clínica y legal en procedimientos de alta complejidad. En Brasil, a pesar de iniciativas puntuales, la actuación del enfermero sigue estando restringida por barreras legales, una formación deficiente y un bajo reconocimiento institucional. La ausencia de regulación de la PAE y de protocolos institucionales compromete la autonomía y afecta la atención que se brinda.* ***Conclusión:*** *La consolidación de la PAE en la terapia de infusión requiere una revisión normativa, el fortalecimiento de la formación especializada y la valoración institucional del enfermero como protagonista estratégico en la atención vascular, con miras a la seguridad del paciente y la cualificación de la asistencia.*

Descriptores*: Práctica Avanzada de Enfermería; Dispositivos de Acceso Vascular; Programas de Enfermería de Pregrado; Formación.*

INTRODUCTION

Advanced Nursing Practice (ANP), alternatively referred to as Advanced Practice Nursing (APN), has become increasingly prominent worldwide and is acknowledged as a central strategy to tackle current health system challenges. The World Health Organization (WHO) considers this model essential for expanding universal coverage, while the International Council of Nurses (ICN) emphasizes its role in advancing the nursing profession.[1] In the Americas, the Pan American Health Organization (PAHO) has supported its adoption, highlighting its role in improving Primary Health Care and increasing population access to essential services.[2,3]

ANP different roles and titles can be grouped into two main categories: Clinical Nurse Specialist (CNS) and Direct Care Nurse (DCN).[4] CNSs are professionals who, after completing nationally regulated foundational training — commonly referred to internationally as Registered Nurse (RN) — pursue specialization in a specific clinical area. DCNs, in turn, widely recognized as Nurse Practitioners (NPs), operate under the legal authority granted by generalist nurses but assume broader clinical responsibilities. Professionals in both categories share responsibilities across four essential domains: clinical practice, research, teaching, and leadership/management, with clinical practice serving as the central focus.[5,6]

In 2002, the International Council of Nurses (ICN) issued its first official position statement on APN, defining the practitioner as "a nurse with a specialized knowledge foundation, complex decision-making skills, and clinical competencies for advanced practice, shaped by the context and/or country where they are licensed to practice. A master's degree is recommended for entry-level practice".[7] Reported benefits in these settings include increased access to health care, greater efficiency in managing complex cases, reduced health system costs, and fewer hospital readmissions.[8]

In Brazil, ANP has increasingly gained space on institutional agendas. In 2023, the Federal Nursing Council (Portuguese acronym: COFEN) issued Technical Note No. 001/2023, recognizing the country's potential to adopt this model, largely due to its well-established stricto sensu nursing programs. In collaboration with the Ministry of Health, COFEN has been working to develop programs aimed at improving population access to services provided through Brazil's Unified Health System (SUS).[9]

The "T-shaped professional" analogy is often used to represent the ideal profile for an advanced practice nurse. Within this framework, the T's horizontal bar denotes general nursing knowledge and skills, whereas the vertical bar reflects advanced technical and clinical expertise in particular areas, developed via

specialized training. This structure supports highly qualified and wide-ranging practice, allowing care to remain personalized, holistic, and centered on the individual's overall needs.[10]

In this context, infusion therapy and vascular access management emerge as strategic areas for ANP integration, requiring specialized clinical skills, autonomous decision-making, and advanced technological proficiency. High-quality venous access care directly impacts patient safety, prevents complications, and improves intravenous therapy outcomes.[10,11] From this perspective, the Advanced Practice Nurse managing infusion therapy demonstrates specialized competencies that enable a wider practice scope compared with generalist nurses handling venous access.

Nevertheless, although advanced practice nurses receive international recognition for their roles in these procedures, Brazilian literature still lacks critical reflections linking technical and scientific advances in this field to regulatory, educational, and institutional challenges encountered in Brazil. Accordingly, this article aims to explore perspectives on Advanced Nursing Practices with a focus on infusion therapy and vascular access management.

METHODS

This reflective study was developed with input from expert nursing researchers, particularly those engaged in Advanced Practice roles specializing in infusion therapy and vascular access management. The discussion was constructed through critical and interpretative analysis applied to national and international scientific literature, together with current professional legislation in Brazil, including COFEN's Technical Note No. 001/2023[9], COFEN's Opinion No. 243/2017[12], and COFEN's Resolutions No. 648/2020[13] and No. 703/2022[14]. This reflective study was grounded in these legal frameworks, which reinforce nurses' specialized skills in providing care to patients needing complex infusion therapy.

The authors identified two main thematic axes: technical and scientific advances in vascular access care from an ANP perspective; and the regulatory and institutional acknowledgment supporting specialist nurse competencies in this field, aligned with contemporary practices in patient care, education, and research.

RESULTS AND DISCUSSION

Technical and scientific advances in vascular access care from an ANP perspective

Vascular access care represents a continuously evolving field, driven by technical and scientific advances aimed at improving patient safety, therapeutic effectiveness, and care quality across diverse clinical settings. Advances in this field are seen not only through a growing variety of devices but also through increasingly complex procedures and the demand for highly skilled professionals to perform these interventions.[10,11]

Among key advances, the wide variety in catheter types currently employed stands out, each indicated according to treatment duration, infusion type, and patient clinical characteristics. Short-term peripheral catheters, peripherally inserted central catheters (PICC), centrally inserted venous catheters (CIVC), peripheral venous catheters with flexible or metallic shafts, and fully implantable catheters (Port-a-Cath) highlight device diversity, which demands technical expertise and strong clinical judgment from the professional in charge.[15,16]

Across international settings, especially in countries with consolidated ANP models such as the United States, Canada, the United Kingdom, and Australia, specialized nurses hold legal authorization to perform deep venous punctures, including central catheter insertion via surgical cutdown or ultrasound-guided placement in internal jugular, subclavian, and femoral veins.[17,18] These practices rely on specific legislation, rigorous clinical training, and recognized professional certification. In these contexts, NP or CNS roles include diagnostic assessment, intravenous therapy prescription, vascular access selection, and autonomous procedural performance, fully integrated into high-complexity care under institutional and regulatory support.[19]

In contrast, current legislative restrictions in Brazil continue to prevent specialist nurses from performing deep venous punctures, including central vein cutdowns and catheter placements in subclavian and femoral veins, despite advances in their infusion therapy training. Through Resolution No. 243/2017, COFEN recognizes nurses' competence to insert peripheral catheters and PICCs using supportive technologies, such as ultrasound guidance and local anesthesia, provided they meet specific technical qualifications.[12] Nevertheless, broader recognition regarding professional competencies has not resolved the structural limitations affecting specialized training. Despite regulatory authorization for

infusion therapy-focused residency programs under Interministerial Ordinance No. 1.077/2009[20], which defines general guidelines for multiprofessional residencies, it can be noted that this training modality remains scarcely implemented nationwide.

Residency programs focused on this area appear to be scarce, largely because high-complexity hospitals are regionally concentrated in the South and Southeast, hindering nationwide expansion. Furthermore, the establishment of residency programs necessitates effective interinstitutional coordination, often contingent on public-private partnerships that remain underdeveloped in the infusion therapy sector. This situation is further compounded by limited political and institutional interest in expanding highly specialized training programs, especially in areas still seeking formal recognition within public health policy frameworks.

Countries that recognize ANP adopt robust nursing education models that combine clinical master's training, extensive supervision, and national certifications for invasive procedures. In Brazil, although there is a growing movement toward advanced education, formal ANP regulation is still lacking, limiting clinical scope expansion and restricting institutional recognition for ANP competencies compared with developed countries.[8,21,22]

Thus, technical and scientific advances in vascular access care highlight the need to revise nursing legal and educational limits in Brazil, especially given international data showing that nurse-led practices — historically performed by physicians — offer safety, effectiveness, and cost benefits[22]. Developing ANP in this field may lead to better care delivery, broader health care access, and higher quality outcomes.

Regulatory and institutional recognition supporting specialist nurse competencies in vascular access and infusion therapy

In Brazil, nurse competencies in vascular access and infusion therapy continue to encounter major challenges in regulatory, institutional, and educational areas. Although certain COFEN regulations provide technical support for nurse practice in this field[12-14], a notable gap persists between what is regulated, what is effectively practiced, and what receives recognition from healthcare institutions as well as from public perception.[8,21-24]

In Brazil, generalist nurse education, according to the National Curriculum Guidelines (Portuguese acronym: DCNs), should provide solid, progressive training that integrates theoretical and practical content from the first semesters. In practice, however, many undergraduate programs encounter significant structural and pedagogical limitations. The increasing prevalence of "distance learning" and "hybrid" programs, often with limited supervision, shortened practical experience, and insufficient lab facilities, compromises clinical training and restricts future professionals to the role of "procedure performers".[23,26,27] This issue is further compounded by students' delayed engagement in patient care, often postponed until the final semesters in many curricula, making it difficult to consolidate technical skills and develop clinical reasoning early on.[27,28]

Limited training in this context considerably compromises nurses' ability to perform effectively in high-complexity areas, including infusion therapy. Insufficient practical exposure to devices, puncture techniques, and clinical procedures in early training fosters professional insecurity and reduces institutional recognition of nurses' contributions in this field. As a result, critical practices are frequently delegated to other healthcare team members, including physicians and nursing technicians, which limits nurses' autonomy and accountability.[28]

By contrast, specialized and interprofessional residency programs in health care have become recognized for providing higher-quality training, fostering stronger links between theoretical knowledge and practical application. Through these residencies, nurses can deepen their knowledge in specialized fields including intensive care, oncology, and urgent and emergency care, where vascular access management is routinely performed.[28,29] However, despite their significance, residency programs specifically targeting infusion therapy or vascular access remain scarce, with these topics often treated in a fragmented way across other specialties.[27] These findings highlight the need for residency and lato sensu postgraduate programs focused on nursing vascular care, offering curricula that combine applied vascular anatomy with technologies like bedside ultrasonography.

At the institutional level, although there are isolated initiatives aimed at valuing nurses specializing in vascular access — such as creating infusion therapy units in medium- and large-sized hospitals —, these practices are still not widely recognized as strategic areas for autonomous nursing practice. Often, nurses remain confined to reactive and technical roles, with limited participation in clinical decision-making and care management. Without institutional protocols formally recognizing these

professionals' broader competencies, their capacity to perform fully is limited, diminishing potential benefits for patient safety and care effectiveness.[29-31]

Accordingly, achieving normative and institutional recognition for nurses' competencies in infusion therapy and vascular access entails thorough reforms in professional training, broader access to continuing and specialized education, and strengthened institutional policies that endorse their autonomous and expert practice. Forming specialized nurse-led teams with comprehensive technical, pedagogical, and scientific backing is key to improving care in critical and high-complexity areas, including vascular access, while supporting the nationwide implementation of Advanced Nursing Practice (ANP).

A primary limitation in this study stems from insufficient empirical data obtained through standard quantitative or qualitative methods. Drawing on a critical literature review and the authors' experience, this analysis may have limited applicability beyond the study context.

CONCLUSION

Despite technical and scientific advances and increased qualification levels in Brazilian nursing, barriers continue to limit the full expansion of ANP focused on infusion therapy. By integrating literature and national regulatory documents, it becomes clear that, despite partial acknowledgment of nurses' skills focused on intravenous therapy, current regulations fail to establish a framework that supports expanded autonomy in complex procedures, including deep punctures and central access care.

In contrast, international experiences show that well-established Advanced Nursing Practice (ANP) models produce measurable improvements in patient safety, along with broader care access, cost-effectiveness, and enhanced care quality. In the Brazilian setting, however, limited regulation for advanced practice, along with restricted specialized training — typically featuring fragmented curricula and minimal hands-on experience — and insufficient institutional support, makes it difficult to implement this care model.

In this context, it becomes imperative to strengthen advanced training, establish clear regulatory guidelines, and recognize specialist nurses' technical autonomy. Developing clinical protocols and integrating nurses into strategic decision-making processes represents a critical strategy for consolidating ANP in infusion therapy, promoting safe and high-quality care in line with contemporary public health priorities in Brazil.

CONTRIBUITIONS

Contributed to the conception or design of the study/research: Rezende LDA, Lopes AB, Freitas PSS. Contributed to data collection: Rezende LDA, Lopes AB, Freitas PSS. Contributed to the analysis and/or interpretation of data: Rezende LDA, Lopes AB, Freitas PSS. Contributed to article writing or critical review: Rezende LDA, Lopes AB, Freitas PSS. Final approval of the version to be published: Rezende LDA, Lopes AB, Freitas PSS.

REFERENCES

1. International Council of Nurses. Guidelines on Advanced Practice Nursing 2020 [Internet]. Geneva (CH): ICN; 2020 [cited 2025 Jul 27]. Available from: https://www.icn. ch/system/files/documents/2020-04/ICN_ APN%20Report_EN_WEB.pdf

2. Organização Pan-Americana de Saúde. Ampliação do papel dos enfermei- ros na atenção primária à saúde [Internet]. Washington (DC): OPAS; 2018 [cited 2025 Jul 27]. Available from: https://iris.paho.org/bitstream/hand- le/10665.2/34960/9789275720035_por. pdf?sequence=6

3. Organização Pan-americana de Saúde. Importância estratégica do investimento nacional em profissionais de enfermagem na Região das Américas [Internet]. Wa- shington (DC): OPAS; 2022 [cited 2025 Jul 27]. Available from: https://iris.paho. org/bitstream/handle/10665.2/56063/ OPASHSSHR220012_po r.pdf ?sequen- ce=1&isAllowed=y#:~:text=Al

4. Schober M, Lehwaldt D, Rogers M, Steinke M, Turale S. Advanced Practice Nursing Guidelines 2020 [Internet]. 2020 [cited 2025 Jul 27]:1-48. Available from: https://www.icn.ch/system/files/documents/2020-04/ICN_APN%20Report_EN_WEB.pdf

5. Parker JM, Hill MN. A review of advanced practice nursing in the united states, canada, australia and hong kong special administrative region (SAR), china. Int J Nurs Sci [Internet]. 2017 Apr [cited 2025 Jul 27];4(2):196-204. DOI: https://doi.org/10.1016/j.ijnss.2017.01.002

6. Bryant-Lukosius D, Valaitis R, Martin-Misener R, Donald F, Peña LM, Brousseau L. Advanced practice nursing: a strategy for achieving universal health coverage and universal access to health. Rev Lat Am Enferm [Internet]. 2017 Jan 30 [cited 2025 Jul 27];25. DOI: https://doi.org/10.1590/1518-8345.1677.2826

7. International Council of Nurses. ICN Strategic Plan (2019-2023) [Internet]. 2019 [cited 2025 Jul 27];1-4. Available from: https://www.icn.ch/sites/default/files/inline-files/Strategicplan.pdf

8. Rezende LD, Funabashi LM, Ciscotto VM, Freitas PD, Fiorin BH, Nascimento DH. Perspectivas para a prática avançada de enfermagem no brasil. Nurs Edicao Bras [Internet]. 2025 Jul 10 [cited 2025 Jul 27];29(324):10932-41. DOI: https://doi.org/10.36489/nursing.2015v29i324p10932-10941

9. Conselho Federal de Enfermagem (BR). Nota Técnica COFEN No 001/2023. Discu- te sobre Práticas Avançadas de Enfermagem no Brasil (PAE): contexto; conceitos; ações empreendidas, implementação e regulação [Internet]. Brasília (DF): COFEN; 2023 [cited 2025 Jul 27]. Available from: http://www.cofen.gov.br/nota-tecnica-co- fen-no-001-2023_109912.html#:~:tex- t=A%20PAE%20

10. Kappert J, Hoop I. Nurse Practitioner professional competency framework [Internet]. Utrecht: ©V&VN; 2019 [cited 2025 Jul 27]. Available from: https://cstor.eu/venvn- vs/2019/06/2019-06-25-Nurse-Practitioner- -Professional-Competency-Framework.pdf

11. Goodfriend L, Kennedy S, Hein A, Baker R. Implementation of a Vascular Access Expe- rience Program to Train Unit-Based Vascu- lar Access Champions. J Infus Nurs. 2020 Jul;43(4):193–9. DOI: https://doi.org/10.1097/ NAN.0000000000000373

12. Conselho Federal de Enfermagem. Cofen - [Internet]. PARECER DE CONSELHEIRO FEDERAL Nº 243/2017/COFEN - Cofen; 2017 Oct 27 [cited 2025 Jul 27]. Available from: https://www.cofen.gov.br/parecer-de-relator-cofen-no-2432017/.

13. Conselho Federal de Enfermagem. Cofen - [Internet]. RESOLUÇÃO COFEN Nº 648/2020 - Cofen; 2020 Sep 17 [cited 2025 Jul 27]. Available from: https://www.cofen.gov.br/resolucao-cofen-no-648-2020/.

14. Conselho Federal de Enfermagem. Cofen - [Internet]. RESOLUÇÃO COFEN nº 703/2022 - cofen; 2022 Jul 18 [cited 2025 Jul 27]. Available from: https://www.cofen.gov.br/resolucao-cofen-no-703-2022/.

15. Nickel B, Gorski L, Kleidon T, Kyes A, De- Vries M, Keogh S, *et al*. Infusion therapy standards of practice, 9th Edition. J Infus Enferm. 2024;47(supl1):S1-S285. DOI: https://doi.org/10.1097/NAN.000000000000053

16. Braga LM, Salgueiro-Oliveira AD, Henriques MA, Arreguy-Sena C, Albergaria VM, Parreira PM. Peripheral venipuncture: comprehension and evaluation of nursing practices. Texto Amp Enferm [Internet]. 2019 [cited 2025 Jul 27];28. DOI: https://doi.org/10.1590/1980-265x-tce-2018-0018

17. Alexandrou E, Murgo M, Calabria E, Spencer TR, Carpen H, Brennan K, Frost SA, Davidson PM, Hillman KM. Nurse-led central venous catheter insertion—Procedural characteristics and outcomes of three intensive care based catheter placement services. Int J Nurs Stud [Internet]. 2012 Feb [cited 2025 Jul 27];49(2):162-8. DOI: https://doi.org/10.1016/j.ijnurstu.2011.08.011

18. Fournier B, Lecluze J, Tharel L, Delpech VN, Jouffroy R. Pose de voie veineuse centrale par l'infirmier, retour sur un protocole de coopération. Soins [Internet]. 2019 Jun [cited 2025 Jul 27];64(836):13-6. DOI: https://doi.org/10.1016/j.soin.2019.03.001

19. Sakai H, Hirosue M, Iwata M, Terasawa T. The effect of introducing a nurse-practitioner-led peripherally inserted central venous catheter placement program on the utilization of central venous access device: A retrospective study in Japan. J Vasc Access [Internet]. 2023 Jun 21 [cited 2025 Jul 27]. DOI: https://doi.org/10.1177/11297298231173160

20. Ministério da Saúde. (BR). Portaria nº 1077, de 12 de novembro de 2009 — Ministério da Saúde; 12 nov 2009 [cited 2025 Nov 25]. Available from: https://www.gov.br/saude/pt-br/composicao/sgtes/deges/legislacao/2018-e-antes/2009/portaria-n-1077-12-novembro-2009.pdf/view

21. Angeli-Silva L, Leitão TD, David HM, Mascarenhas NB, Acioli S, Silva TP. Estado da arte sobre Práticas Avançadas em Enfermagem: reflexões para a agenda no Brasil. Rev Bras Enferm [Internet]. 2022 [cited 2025 Jul 27];75(5). DOI: https://doi.org/10.1590/0034-7167-2022-0151pt

22. Olímpio JD, Araújo JN, Pitombeira DO, Enders BC, Sonenberg A, Vitor AF. Prática Avançada de Enfermagem: uma análise conceitual. Acta Paul Enferm [Internet]. Dez 2018 [cited 2025 Nov 25];31(6):674-80. Available from: https://doi.org/10.1590/1982-0194201800092

23. Soares FA, Rocha KK, Portela RD, Silva AC, Corrêa RD, Oliveira BL. Cenário da educação superior à distância em saúde no Brasil: a situação da Enfermagem. Esc Anna Nery [Internet]. 2021 [cited 202 May 25];25(3). Available from: https://doi.org/10.1590/2177-9465-ean-2020-0145

24. Saraiva AK, Macedo CM, Leonello VM, Oliveira MA. A expansão dos cursos de graduação em Enfermagem: cenário, interesses e desafios do ensino a distância. Rev Esc Enferm USP [Internet]. 2021 [cited 2025 Jul 27];55. DOI: https://doi.org/10.1590/s1980-220x2020009903784

25. Magnago C, Pierantoni CR. A formação de enfermeiros e sua aproximação com os pressupostos das diretrizes curriculares nacionais e da atenção básica. Cienc Amp Saude Coletiva [Internet]. 2020 Jan [cited 2025 Jul 27];25(1):15-24. DOI: https://doi.org/10.1590/1413-81232020251.28372019

26. Alvarenga JT, Nicolussi AC, Ramos AM, Gomes LF, Monteiro DA, Toffano SE. Conhecimento e experiência de graduandos de enfermagem em terapia infusional e acessos vasculares periféricos. Rev Bras Enferm [Internet]. 2023 [cited 2025 Jul 27];76(3). DOI: https://doi.org/10.1590/0034-7167-2022-0219pt

27. Silva RM, Freitas LD, Araújo CL, Camargo J, Franco AM, Silva JN, Ferreira IP. Importância da residência em enfermagem no processo ensino-aprendizagem: uma revisão integrativa. Rev Enferm Atual Derme [Internet]. 2019 Mar 9 [cited 2025 Jul 27];86(24). DOI: https://doi.org/10.31011/reaid-2018-v.86-n.24-art.120

28. Souza DD, Lins SM, Cavalcanti AL, Tomaz CP. Prática Avançada de Enfermagem: relato de experiência de um time de terapia infusional. Online Braz J Nurs [Internet]. 2024 Sep 28 [cited 2025 Jul 27];22(Suppl2). Available from: https://doi.org/10.17665/1676-4285.20246725

29. Silva BS, Santos LM, Rocha PK, Mota AN, Avelar AF, Kusahara DM. National practice of Nursing professionals in the insertion of peripheral vascular access devices. Rev Lat Am Enferm [Internet]. 2024 [cited 2025 Jul 27];32. DOI m: https://doi.org/10.1590/1518-8345.6673.4314

30. Rosich-Soteras A, Bonilla-Serrano C, Llauradó-González MÀ, Fernández-Bombín A, Triviño-López JA, Barceló-Querol L, Heredia-Aguilar L, Frías-Martín MC, Valverde-Bosch M, Corominas-Bosch ML, Domènech A. Implementation of a vascular access team and an intravenous therapy programme: a first-year activity analysis. J Vasc Access [Internet]. 2024 Jan 11 [cited 2025 Jul 27]. DOI: https://doi.org/10.1177/11297298231220537

31. Araujo NS, Silva JD, de Oliveira AP, Silva PC. Challenges and research in health sciences: a multidisciplinary approach [Internet]. [place unknown]: Seven Editora; 2024. Vascular accesses and infusional therapy: an experience report; [cited 2025 Jul 27]. DOI: https://doi.org/10.56238/sevened2024.012-052

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