

Nurses' responsibility in reducing risk factors for phlebitis in adults in inpatient units

Responsabilidad de las enfermeras en la reducción de los factores de riesgo de flebitis en adultos en unidades de hospitalización

Responsabilidade do enfermeiro na redução dos fatores de risco de flebites em adultos nas unidades de internação

Ronei Cavalheiro^{1*}

ORCID: 0009-0002-0722-6654

Jessica Alessandra Pereira¹

ORCID: 0000-0002-6307-0343

Cláudia Rosana Trevisani Corrêa²

ORCID: 0000-0002-3158-8666

Samoel Mariano¹

ORCID: 0000-0002-8395-2685

Natália Stevanato Silva¹

ORCID: 0009-0007-6719-0725

Kayo Augusto Salandin Pacher¹

ORCID: 0000-0002-0623-6669

Márcia Regina de Oliveira

Nicola¹

ORCID: 0009-0001-5733-9350

Alexandre Lobo Leite¹

ORCID: 0009-0001-8470-4181

Ítalo Frizo¹

ORCID: 0000-0002-9736-3785

Anelvira de Oliveira Florentino¹

ORCID: 0000-0001-8628-0565

¹Faculdade de Ensino Superior Santa Bárbara. São Paulo, Brazil.

²Universidade Estadual Paulista. São Paulo, Brazil.

How to cite this article:

Cavalheiro R, Pereira JA, Corrêa CRT, Mariano S, Silva NS, Pacher KAS, Nicola MRO, Leite AL, Frizo I, Florentino AO. Nurses' responsibility in reducing risk factors for phlebitis in adults in inpatient units. *Glob Acad Nurs.* 2023;4(Sup.3):e402. <https://dx.doi.org/10.5935/2675-5602.20200402>

*Corresponding author:

105945@faesb.edu.br

Submission: 10-11-2023

Approval: 11-05-2023

Abstract

This study aimed to critically reflect on the care processes related to the development of phlebitis in adult patients in inpatient units. This is a critical reflection study based on an exploratory and retrospective bibliographic review, with articles selected from the SciELO and BVS databases (2018-2022), using the descriptors "Venous Catheter AND Phlebitis", "Phlebitis AND Hospitalization", and "Health Professionals". The critical analysis showed that phlebitis, associated with factors such as inadequate insertion technique, catheter caliber, and length of stay, represents a frequent adverse event, with high rates in inpatient units. The results indicated that the adoption of evidence-based protocols, such as the Maddox scale and the Infusion Nurses Society guidelines, combined with ongoing staff education, significantly reduces its incidence. The underreporting of these events and the need to strengthen the safety culture are also discussed, with an emphasis on the role of nurses in systematic assessment and implementation of preventive measures. It is concluded that standardization of techniques, the use of safe technologies, and continuous monitoring are essential to minimize complications, reinforcing the importance of nursing leadership in ensuring the quality of care and risk management in intravenous therapy.

Descriptors: Intravenous Catheter; Phlebitis; Hospitalization; Health Professionals; Nursing.

Resumén

El objetivo de este estudio fue reflexionar críticamente sobre los procesos de atención relacionados con el desarrollo de flebitis en pacientes adultos en unidades de hospitalización. Se trata de un estudio de reflexión crítica basado en una revisión bibliográfica exploratoria y retrospectiva, con artículos seleccionados de las bases de datos SciELO y BVS (2018-2022), utilizando los descriptores "Catéter Venoso Y Flebitis", "Flebitis Y Hospitalización" y "Profesionales de la Salud". El análisis crítico mostró que la flebitis, asociada a factores como la técnica de inserción inadecuada, el calibre del catéter y la duración de la estancia hospitalaria, representa un evento adverso frecuente, con altas tasas en las unidades de hospitalización. Los resultados indicaron que la adopción de protocolos basados en la evidencia, como la escala de Maddox y las directrices de la Infusion Nurses Society, junto con la formación continua del personal, reduce significativamente su incidencia. También se discute el subregistro de estos eventos y la necesidad de fortalecer la cultura de seguridad, con énfasis en el papel del personal de enfermería en la evaluación sistemática y la implementación de medidas preventivas. Se concluye que la estandarización de técnicas, el uso de tecnologías seguras y el monitoreo continuo son esenciales para minimizar las complicaciones, reforzando la importancia del liderazgo de enfermería en la calidad de la atención y la gestión de riesgos en la terapia intravenosa.

Descriptoros: Catéter Intravenoso; Flebitis; Hospitalización; Profesionales de la Salud; Enfermería.

Resumo

Objetivou-se refletir criticamente sobre os processos assistenciais relacionados ao desenvolvimento de flebitis em pacientes adultos em unidades de internação. Trata-se de um estudo de reflexão crítica fundamentado em uma revisão bibliográfica exploratória e retrospectiva, com artigos selecionados nas bases SciELO e BVS (2018-2022), utilizando os descritores "Cateter Venoso AND Flebitis", "Flebitis AND Internação" e "Profissionais da Saúde". A análise crítica evidenciou que a flebite, associada a fatores como técnica inadequada de inserção, calibre do cateter e tempo de permanência, representa um evento adverso frequente, com taxas elevadas em unidades de internação. Os resultados apontaram que a adoção de protocolos baseados em evidências, como a escala de Maddox e as diretrizes da *Infusion Nurses Society*, aliada à educação permanente da equipe, reduz significativamente sua incidência. Discute-se ainda a subnotificação desses eventos e a necessidade de fortalecer a cultura de segurança, com ênfase no papel do enfermeiro na avaliação sistemática e na implementação de medidas preventivas. Conclui-se que a padronização de técnicas, o uso de tecnologias seguras e a monitorização contínua são essenciais para minimizar complicações, reforçando a importância da liderança do enfermeiro na qualidade da assistência e na gestão de riscos em terapia intravenosa.

Descriptoros: Cateter Intravenoso; Flebitis, Internação Hospitalar; Profissionais da Saúde; Enfermagem.



Introduction

In Brazil, peripheral intravenous catheters (PIVCs) are used in 90% of hospitalized patients who require intravenous therapy (IVT), an invasive technique with both therapeutic and diagnostic indications, and are an essential resource within the hospital environment for the infusion of solutions and medications. On average, up to 75% of patients use peripherally inserted devices to facilitate the administration of medications, fluids, and other blood and nutritional components into the body, which favors the occurrence of local or systemic complications. Therefore, it is the responsibility of the nursing team to use peripherally inserted venous catheters appropriately, considering the choice of puncture site, the caliber of the device, its maintenance when punctured, and measures to prevent risk factors. PIVCs are frequently used in health services due to their ease of rapid access to the vascular system, being the most performed invasive practice, with less risk to the patient and low cost-benefit when compared to other more invasive options of centrally inserted intravenous catheters that have high costs¹.

In 2013, the National Patient Safety Program, through Ordinance GM No. 529, of April 1, was created to promote and support safety measures related to assistance in the areas of health care, considering prevention as essential in all stages of care and that Adverse Events (AEs) can be responsible for permanent damage, deaths and increased costs to health services; the implementation of Risk Management and Patient Safety Centers become necessary for safe care¹.

AEs affect 4% to 16% of hospitalized patients in developed countries, and this number may be even higher in developing countries, which justifies the need for managers and leaders to implement institutional conditions for effective safety practices to prevent harm to patients and promote advances in the quality of care provided¹.

In this context, health services have made major technological advances, including the manufacture of new peripheral venous insertion devices, connections and accessories for intravenous infusion, such as scalpels with gauges 19 to 27, short-term needle devices that can be used for 24 hours, whether for infusions of solutions, blood collection, or single-dose medications. Another advance is flexible catheters with gauges 14 to 26, used more frequently in long-term procedures, hospitalizations, and infusion of large volumes, and their permanence can vary from 72 to 96 hours, respecting institutional protocols. Peripherally inserted central catheters (PICC) are installed in a central vein, exclusively by a qualified nurse, using a needle, guide, and introducers for intravenous infusion for therapies with vasoactive drugs, antibiotics, peripheral parenteral nutrition, and hypertonic infusions. Classified as long-term, they can be used for up to 180 hours if their maintenance and permeability are adequate².

The relationship and importance of choosing the material are related to daily care practice and investments in health products and services, in addition to their use, are related to the risk of complications, such as occlusion,

Among the many resources and technologies available on the market, there is no risk of complications during the use of these devices. This statement is based on previous studies demonstrating the incidence of vascular trauma related to the use of CIVP, with emphasis on the adverse event phlebitis².

Phlebitis is an inflammation recognized by clinical manifestations, such as: pain, erythema, redness, edema and palpable venous cord; causing in the intimate layer of the vein, a response to tissue injury that has several associated factors, including the appropriate choice of CIVP, its caliber, the speed of infusion of solutions, prolonged use of antibiotics, type of drug administered via the route, puncture site, skin antiseptics before insertion and maintenance of the catheter, patient age, nutritional pattern, among other situations that are directly related to the risk of phlebitis².

According to a study³, Scales and tools for grading phlebitis have been implemented and used to establish safer conduct regarding the use of PIVCs. Among these scales, Maddox was the first to be developed based on clinical evidence that was observed, considering intravenous therapy. To contribute to grading the signs of phlebitis, the Infusion Nurses Society revised the Infusion Therapy Standards of Practice in 2016, which is a manual that standardizes best practices in infusion therapy. In this manual, the society guides the use of standardized scales for assessing phlebitis that are validated, reliable, and clinically viable, for both adults and children.

There are three types of phlebitis, such as: mechanical, resulting from trauma caused by the PIC during puncture, whose caliber occupies more than two-thirds of the lumen of the blood vessel or is poorly fixed to the patient's skin, causing shearing in the vessel wall as the patient moves; chemical, when there is a relationship with the infusion of fluids or solutions with low solubility, extreme pH below 5.0 (acidic) or above 9.0 (alkaline), or high osmolarity above 375 mOsm/l, or due to the presence of small particles in the solution due to failure in reconstitution during the preparation of solutions; and infectious, related to lack of adherence to the hand washing technique, contamination of solutions and breach of aseptic technique during insertion of the PIVC and in the handling of devices and solutions⁴.

A Portuguese study carried out a cross-cultural adaptation of the scale proposed by the Infusion Nurses Society, which contains four levels of graduation, to classify infiltration, and is called the Infiltration Scale. For this scale, grade zero represents the absence of infiltration and grade 4, the most severe. The scale also details which clinical criteria need to be evaluated for each degree of infiltration, namely:

"[...] skin color, skin temperature to the touch, pain, extent and depth of edema, altered sensitivity, circulatory impairment, and infiltration of blood derivatives or irritant or vesicant solutions. The identification of a clinical criterion is sufficient to characterize the degree of infiltration, and removal of peripheral



Cavalheiro R, Pereira JA, Corrêa CRT, Mariano S, Silva NS, Pacher KAS, Nicola MRO, Leite AL, Frizo I, Florentino AO
venous catheters is recommended when one of these criteria is identified [...]”².

Many studies investigate risk factors related to the occurrence of this complication point to multifactorial causes. This research sought to analyze and reflect on the occurrence of adverse events related to phlebitis and its complications, with the aim of adding knowledge and evaluating the causes of these occurrences, and seeking solutions and interventions that, during the nursing process, can be used to work on their prevention. The identification of risk factors can help in the development of protocols and in the institution of care directed at the individuality of the patient, to prevent the occurrence of the phlebitis complication⁵.

Based on the Resolution of the Federal Nursing Council No. 0358/2009, the nurse in the hospital environment is responsible for the nursing assessment and care process, using indicators as assessment and management instruments, as tools that facilitate the assessment and monitoring of adverse events that may affect patients, to create institutional processes that develop a culture of safe techniques and practices, raising and improving the level of care⁶.

Given the above, the aim was to critically reflect on the care processes related to the development of phlebitis in adult patients in inpatient units; in addition to highlighting how the care processes carried out by nurses can help reduce the number, occurrence of adverse events, and number of injuries.

Methodology

This study consists of a critical reflection based on an exploratory and retrospective bibliographic review. The critical approach allowed the analysis of care practices, institutional protocols, and scientific evidence related to the prevention of phlebitis, highlighting the role of the nurse as a central agent in promoting patient safety.

The selection of sources was carried out in the Scientific Electronic Library Online (SciELO) and Virtual Health Library (VHL) databases, using the descriptors "Venous Catheter AND Phlebitis", "Phlebitis AND Hospitalization", and "Health Professionals", with a time frame from 2018 to 2022. The inclusion criteria prioritized original articles, systematic reviews, and clinical guidelines that addressed the topic from care, epidemiological, and health management perspectives.

The selected articles were analyzed through critical analysis, including title, authorship, year, and country of publication; context and methodological design; objectives and main findings; and relationship with clinical practice and patient safety. The critical analysis was conducted based on theoretical frameworks of intravenous therapy, patient safety, and risk management, allowing the identification of gaps in knowledge, inconsistencies in practices, and opportunities for improvement in care processes. In addition, the recommendations of the Infusion Nurses Society (INS) and national regulations, such as RDC No.

36/2013, which establishes the Patient Safety Centers (NSP) were considered.

The proposed reflection sought to integrate scientific evidence into the healthcare reality, highlighting the need for standardized protocols, continuing education, and monitoring of indicators as essential strategies for reducing phlebitis.

Results and Discussion

In Brazil, the Board of Directors Resolution (RDC) No. 36 of July 25, 2013, established the mandatory implementation of Patient Safety Centers (NSP) in health services in the country. In compliance with the technical regulation, the NSP of health services in Brazil has been reporting adverse events (AE) related to care to the National Health Surveillance System (SNVS) monthly. The record is made through the Health Care module of the Health Surveillance Notification System (NOTIVISA)⁷.

An important role of the SNVS involves the surveillance and monitoring of incidents related to healthcare, in addition to promoting the return of information to the reporting parties. It is also known that it is essential to associate the results obtained with pertinent prevention measures, detecting risks in care, determining the causes of AEs, and proposing safe practices for risk reduction and patient safety in healthcare services. Therefore, the General Management of Technology in Healthcare Services (GGTES/Anvisa) aims to publish this report to make available the results obtained by analyzing data on incidents related to healthcare reported by the NSP of the country's healthcare services to the SNVS, through NOTIVISA System⁸.

Among the 27 states of Brazil, the cases reported in the National Health Surveillance System (SNVS), through the NOTIVISA digital platform, in the period from January to December 2022, show that 39,994 adverse events related to intravenous catheters were reported throughout the national territory, not specified according to the degree of damage, nor their classification, representing 16% of the total incident reports made by the Patient Safety Centers (NSPs) of health services in the period, representing the third most reported incident in the Notivisa System - Health Care module, with 6,500 reports in the state of São Paulo, the second state that reported the most, Minas Gerais with 8,500 reports, the state that reports the least is the state of Amapá, with 13 reported cases, the lack of specificity regarding the degree of damage occurs due to the lack of standardization in the protocol/diagnosis of adverse events, in the monitoring and procedures applied, causing divergences in the classification of occurrences by professionals and underreporting^{9,10}.

In the literature, there is nothing universally evidenced that specifies factors for predisposition to phlebitis. The most cited risk factors range from factors related to the patient, age over 60 years, skin sensitivity, type of catheter, therapy administered, comorbidities such as diabetes, length of catheter stay, choice of puncture site, insertion technique, technical-scientific knowledge, failure in technique, and lack of hand washing^{11,12}.



Faced with this information, nurses are responsible for managing, identifying, and assessing risks, determining factors that contribute to the occurrence of AEs, and implementing assistance processes that contribute to patient safety practices to reduce the number of occurrences of these adverse events and reduce the number of injuries¹³.

According to the Intravenous Nurses Society (INS), the acceptable rate of phlebitis in each patient population should be 5% or less. Therefore, it is essential that the nursing team working in health services is aware of the risk factors that may favor the occurrence of phlebitis and classify it according to the degree presented and its local clinical manifestations, avoiding its occurrence and its aggravations¹⁴.

Promoting a culture of safety for infusion therapy depends on monitoring safety through quality indicators and adverse events and planning safe infusion therapy, which ensures the use of quality technologies focused on patient needs and the implementation of improvement cycles supported by good practices and best evidence.

Final Considerations

The following research highlighted the role of nurses in the prophylaxis and reduction of cases of phlebitis in hospital units, and could observe the importance of the process of reporting adverse events related to the use of

venous catheters within the hospital environment, a subject that is still permeated by several positive aspects, such as the culture of patient safety and improvement of the care process, and negative aspects to be overcome, such as the view of professionals as punitive issues.

In this sense, constant updating and awareness-raising actions on the subject are necessary, and it is essential to know the causes and reasons that may be associated with the occurrence of phlebitis, to better address management and care processes, promote preventive strategies that aim to reduce risks, such as: continuing education, review and guidance on peripheral venipuncture technique, standardization of reconstitution of vesicant drugs and reduction of catheter insertion time.

Furthermore, healthcare institutions must invest in safer technologies, such as catheters with biocompatible materials and appropriate fixation systems, as well as in the implementation of checklists during the insertion and maintenance of peripheral catheters. Standardization of procedures, combined with continuous auditing and active participation of nurses in reporting adverse events, can contribute to the construction of a safer and more efficient care environment. In this way, proactive nursing action, based on evidence and aligned with patient safety policies, not only reduces the incidence of phlebitis but also strengthens the quality of care provided, resulting in better clinical outcomes and optimization of hospital resources.

References

1. Agência Nacional de Vigilância Sanitária (ANVISA). Nota Técnica GVIMS/GGTES/DIRE3/ANVISA Nº 04/2022. Práticas seguras para a prevenção de incidentes envolvendo cateter intravenoso periférico em serviços de saúde. Brasília: ANVISA; 2022. [acesso em 2023 Maio 17]. Disponível em: <https://ameci.org.br/wp-content/uploads/2022/07/Nota-técnica-prevenção-lesão-associada-a-cateter-venoso-rev-GVIMS-26-07-22-para-o-portal.pdf>
2. Braga LM, Parreira PM, Oliveira ASS, Mónico LSM, Arreguy-Sena C, Henriques MA. Flebite e infiltração: traumas vasculares associados ao cateter venoso periférico. *Rev Latino-Am Enfermagem*. 2018;26:e3002. <https://doi.org/10.1590/1518-8345.2377.3002>
3. Simões AMN, Vendramim P, Pedreira MLG. Fatores de risco para flebite relacionada ao uso de cateteres intravenosos periféricos em pacientes adultos. *Rev Esc Enferm USP*. 2022;56:e20210398. <https://doi.org/10.1590/1980-220X-REEUSP-2021-0398>
4. Conselho Regional de Enfermagem de São Paulo (COREN-SP). Parecer COREN-SP 017/2019. Possibilidade de profissionais de Enfermagem utilizarem a escala de Maddox e demais escalas para avaliação de flebite. São Paulo: COREN-SP; 2019. [acesso em 2023 Maio 17]. Disponível em: <https://portal.coren-sp.gov.br/wp-content/uploads/2019/08/Parecer-017.2019-Escala-de-Maddox.pdf>
5. Enes SMS, Opitz SP, Faro ARMC, Pedreira MLG. Phlebitis associated with peripheral intravenous catheters in adults admitted to hospital in the Western Brazilian Amazon. *Rev Esc Enferm USP*. 2016;50(2):261-9. <https://doi.org/10.1590/S0080-623420160000200012>
6. Costa AS, França ECP, Paula RAB. Atuação do enfermeiro frente a flebite: sob o ponto de vista da segurança do paciente. *REVELA*. 2017;(21):1-12. [acesso em 2023 Maio 24]. Disponível em: http://fals.com.br/novofals/revela/ed21/ATUACAO_DO_ENFERMEIRO_FRENTE_A_FLEBITE.pdf
7. Inocencio JS, Ferreira RAS, Araujo DC, Pinheiro FGMS, Vaez AC. Flebite em acesso intravenoso periférico. *Arq Ciênc Saúde*. 2017;24(1):105-9. https://repositorio-racs.famerp.br/racs_ol/vol-24-1/flebite-em-acesso-intravenoso-periferico.pdf
8. Evangelista ACS, Costa BHC, Santos TBR, Alvin ALS. Prevenção de flebitis: conhecimento dos profissionais de enfermagem. *J Health NPEPS*. 2021;6(1):205-17. <https://doi.org/10.30681/252610105219>
9. Almeida ACN, Pires MH, Santana IS, Salgado PO, Toledo LV, Braga LM. Eficácia de uma intervenção educativa para prevenção de complicações no cateter venoso periférico. *Cogitare Enferm*. 2022;27:e83329. <https://doi.org/10.5380/ce.v27i0.83329>
10. Furlan MS, Lima AFC. Avaliação da ocorrência do evento adverso flebite em pacientes de uma Unidade de Internação Clínica. *Rev Esc Enferm USP*. 2021;55:e03755. <https://doi.org/10.1590/S1980-220X2020017103755>
11. Alves DA, Lucas TC, Martins DA, Cristianismo RS, Braga EVO, Guedes HM. Avaliação das condutas e manutenção do cateter intravenoso periférico. *Rev Enferm Cent-Oeste Mineiro*. 2019;9:e3035. <http://doi.org/10.19175/recom.v9i0.3005>
12. Neri AMN, Funez MI, Vasquez CI, Rocha PRS. Eventos adversos associados ao uso de vasopressores em cateter venoso periférico. *Rev Urbanism*. 2022;22(7):1-12. <http://doi.org/10.53660/CLM-713-540>
13. Urbanetto JS, Freitas APC, Oliveira APR, Santos JCR, Muniz FOM, Silva RM, et al. Fatores de risco para o desenvolvimento da flebite. *Rev Gaúcha Enferm*. 2017;38(4):e57489. <https://doi.org/10.1590/1983-1447.2017.04.57489>



14. Santana RCB, Pedreira LC, Guimarães FEO, Almeida LPB, Reis LA, Menezes TMO, et al. Cuidados da equipe de Enfermagem na punção intravenosa periférica segura em idosos hospitalizados. REME Rev Min Enferm. 2019;23:e-1182. <https://doi.org/10.5935/1415-2762.20190029>
15. Mascarenhas FAS, Anders JC, Gelbcke FL, Lanzoni GMM, Ilha P. Facilidades e dificuldades dos profissionais de saúde frente ao processo de notificação de eventos adversos. Texto Contexto Enferm. 2019;28:e20180040. <https://doi.org/10.1590/1980-265X-TCE-2018-0040>

