

Nurses' knowledge about the assessment and therapeutic plan of patients at risk of venous thromboembolism

Conhecimento de enfermeiros sobre a avaliação e o plano terapêutico de pacientes com risco de tromboembolismo venoso

Conocimiento de los enfermeros sobre la evaluación y el plan terapéutico de los pacientes con riesgo de tromboembolismo venoso

Jessica França Pereira¹ ; Ana Lucia Cascardo Marins¹ ; Karla Bianca Silva de Andrade¹ ;
Raquel de Mendonça Nepomuceno¹ ; Luana Ferreira de Almeida¹ ; Andrezza Serpa Franco¹ 

¹Universidade do Estado do Rio de Janeiro. Rio de Janeiro, RJ, Brazil

ABSTRACT

Objective: to analyze the knowledge of nurses in cardiology units about prevention measures and interventions for venous thromboembolism. **Method:** cross-sectional descriptive study with a quantitative approach. Data collection consisted of characterizing the participants and their knowledge of risk stratification, prevention, and nursing care, obtained through an online questionnaire and statistically analyzed. **Results:** the risk factors identified were limited ambulation, immobilization, use of contraceptives, and postoperative period. Regarding the signs and symptoms, pain, tenderness in the calf, and burning in the lower limbs stood out. In pulmonary embolism, dyspnea, tachypnea, and pleuritic pain prevailed. In risk stratification, 51% stated that they knew at least one scale. The barriers identified were the absence of institutional protocols and lack of continuity in care. **Conclusion:** nurses have some knowledge about venous thromboembolism, but there are gaps to be overcome, including the need for training, protocols, and improvements in continuity of care.

Descriptors: Nursing Care; Nurses; Venous Thromboembolism; Knowledge.

RESUMO

Objetivo: analisar o conhecimento dos enfermeiros de unidades cardiológicas sobre as medidas de prevenção e intervenções para o tromboembolismo venoso. **Método:** estudo descritivo transversal com abordagem quantitativa. A coleta de dados consistiu na caracterização dos participantes e do conhecimento em estratificação de risco, prevenção e cuidados de enfermagem, obtidos através de um questionário online e analisados estatisticamente. **Resultados:** os fatores de risco apontados foram deambulação limitada, imobilização, uso de contraceptivos e pós-operatório. Quanto aos sinais e sintomas, destacaram-se dor, sensibilidade na panturrilha e queimação nos membros inferiores. Na embolia pulmonar, prevaleceram dispnéia, taquipnéia e dor pleurítica. Na estratificação de risco, 51% afirmaram conhecer ao menos uma escala. As barreiras identificadas foram a ausência de protocolos institucionais e a falta de continuidade no cuidado. **Conclusão:** os enfermeiros têm algum conhecimento sobre tromboembolismo venoso, mas há lacunas a serem superadas, incluindo a necessidade de treinamentos, protocolos e melhorias na continuidade do cuidado.

Descritores: Cuidados de Enfermagem; Enfermeiras e Enfermeiros; Tromboembolia Venosa; Conhecimento.

RESUMEN

Objetivo: analizar el conocimiento de los enfermeros de unidades de cardiología sobre las medidas de prevención e intervenciones del tromboembolismo venoso. **Método:** estudio descriptivo transversal con enfoque cuantitativo. La recolección de datos consistió en la caracterización de los participantes y su conocimiento sobre estratificación de riesgo, prevención y cuidados de enfermería, obtenidos mediante un cuestionario *online* y analizados estadísticamente. **Resultados:** los factores de riesgo identificados fueron movilidad reducida, inmovilización, uso de anticonceptivos y postoperatorio. En cuanto a los signos y síntomas, los más destacables fueron dolor, sensibilidad en la pantorrilla y ardor en miembros inferiores. En la embolia pulmonar predominaron la disnea, la taquipnea y el dolor pleurítico. En la estratificación de riesgo, el 51% afirmó conocer al menos una escala. Las barreras identificadas fueron ausencia de protocolos institucionales y falta de continuidad en la atención. **Conclusión:** Los enfermeros tienen algunos conocimientos sobre el tromboembolismo venoso, pero hay lagunas por superar, tales como necesidad de capacitación, protocolos y mejoras en la continuidad de la atención.

Descriptores: Atención de Enfermería; Enfermeras e Enfermeros; Tromboembolia Venosa; Conocimiento.

INTRODUCTION

Cardiovascular diseases are the leading cause of mortality worldwide¹. Thromboembolism is the third most prevalent acute cardiovascular condition, after ischemic heart syndromes and strokes^{2,3}. It is estimated that in Brazil, between 2010 and 2021, the number of hospitalizations related to VTE exceeded 500 thousand, with more than 67 thousand deaths recorded between 2010 and 2019².

Corresponding author: Jessica França Pereira. E-mail: jessica.france.p@gmail.com
Editor-in-Chief: Cristiane Helena Gallasch; Associate Editor: Mercedes Neto

Venous thromboembolism (VTE) occurs when one or more clots form in the venous network, preventing blood flow through the body's veins. It manifests itself in two ways: pulmonary thromboembolism (PTE) and deep vein thrombosis (DVT)². DVT mainly affects the venous vessels of the lower limbs, causing partial or total obstruction of the vessel⁴. It can be considered the main cause of preventable death in the in-hospital environment^{2,3}.

PE is characterized by the obstruction of one or more pulmonary arteries, and is usually caused by blood clots, most frequently from DVT in the lower extremities. It is defined as an obstruction of one or more pulmonary arteries, which in most cases was caused by blood clots that reach pulmonary arteries².

It is reported that more than half of hospitalized patients may develop VTE⁵. The risk ratio for developing the disease is the same for clinical and surgical patients³. Risk factors include hereditary/idiopathic (thrombophilia, history of previous VTE) and acquired/caused factors (advanced age - considered risk from 40 years of age, comorbidities, immobilization, use of central venous catheters, infections, surgical treatment, chemotherapy, among others described in scientific literature). It is noteworthy that individuals with multiple factors have a higher risk of developing thromboembolism^{2,6}.

VTE prevention can be approached with both mechanical and pharmacological measures. In the mechanical aspect, strategies include the use of compression stockings, intermittent pneumatic compression boots, passive and active movement of the lower limbs, early ambulation and motor physiotherapy of the lower limbs^{7,8}. In the pharmacological aspect, medications such as unfractionated heparin, low molecular weight heparin, fondaparinux, in addition to the so-called new oral anticoagulants - dabigatran, rivaroxaban and apixaban², are used.

Nurses play an essential role in preventing VTE, as they are the professionals responsible for providing continuous and comprehensive care to patients. With their ability to recognize the various risk factors associated with VTE and implement preventive measures in hospitalized patients⁶.

Caprini scales are tools that allow the assessment and scoring of risk factors, facilitating the understanding that patients with the same number of factors may present different levels of risk for VTE⁹.

However, despite the existence of protocols and guidelines that guide VTE prophylaxis, adherence to these measures is low, especially the prescription of mechanical prophylactic measures⁷. Among the factors that explain this reduced implementation, authors point to the fear of bleeding and the lack of adequate knowledge about VTE⁹.

This study is justified by the high incidence of deaths and complications resulting from VTE, especially in hospitalized patients or after discharge, when compared to the non-hospitalized population⁶. In addition, there is a considerable financial impact on health system⁹.

Like this, the present study aimed to analyze the knowledge of nurses in cardiology units (clinical and surgical cardio intensive care) about preventive measures and nursing interventions for venous thromboembolism.

METHOD

This is a descriptive, cross-sectional study with a quantitative approach, developed in the cardiology units (clinical cardio-intensive and surgical cardio-intensive) of a university hospital located in the State of Rio de Janeiro.

The population consisted of on-call nurses, routine nurses and resident nurses. The sample was selected by convenience, considering the availability and accessibility of professionals during the data collection period.

Cardio-intensive care unit consists of eight beds, with ten on-call nurses, one routine nurse and eight resident nurses in cardiology. The surgical cardio-intensive care unit has 12 beds, with 18 on-call nurses, three routine nurses and 16 resident nurses, of which eight are residents of the cardiovascular nursing program and eight of the intensive care nursing program. Nurses directly responsible for the care of adult hospitalized patients were included. Those who exclusively performed managerial functions in the selected units were excluded, as they were not involved in direct patient care.

Data collection took place between July and October 2023, through a direct approach carried out by the main researcher. The link to the online questionnaire was sent after the research participant accepted the informed consent form. The data collection instrument built based on previously developed studies^{10,11}, consisted of two parts, totaling 14 objective questions. These questions were answered on a scale that offered options such as "all/almost all patients", "some patients" and "no patients"; criteria listed with the option of multiple answers for questions related to risk factors, signs and symptoms, scales, prophylactic measures and treatments; in addition

to true or false alternatives. The questions addressed the characterization of the study participants, as well as knowledge about risk stratification, prevention measures and nursing care related to VTE.

The data used to characterize the participants included information on gender, age, time since graduation, academic background, and participation in training courses on venous thromboembolism. The variables related to nurses' knowledge about VTE addressed: assessment and implementation of prophylactic measures in hospitalized patients; identification of risk factors; recognition of signs and symptoms of DVT and PE; familiarity with risk classification scales; knowledge of mechanical and pharmacological prophylactic measures; and understanding of nursing care in the treatment of VTE.

The data were stored and analyzed in a *Microsoft Office Excel® spreadsheet*. The questionnaires were numbered ordinally according to the participants' responses, ensuring anonymity. We chose to use simple descriptive statistics to obtain absolute and relative frequencies, mean and standard deviation.

The research protocol related to this study was approved by the Research Ethics Committee of the proposing institution. Participants' consent was obtained by selecting the "I accept" item, after reading and signing the Free and Informed Consent Form.

RESULTS

The study was carried out with 35 nurses, in which females predominated, totaling 30 (86%). The average age was 33 (± 9.5) years, with an average time since graduation of approximately 6 (± 7.5) years. Regarding academic training, 26 participants had specialization (75%), 24 in *lato sensu* (69%) and 2 in *stricto sensu* (6%). It was identified that 28 nurses had never participated in a course or in-service training on prevention and/or evaluation of venous thromboembolism (82%).

Among the participants, 11 indicated that they performed an assessment on all or almost all patients (32%), while 17 assessed some patients (50%) and six stated that they did not assess the VTE risks of hospitalized patients (18%). Regarding the main barriers cited for the assessment and implementation of prophylactic measures, 16 attributed this to the lack of a standardized protocol (73%), and 13 mentioned the lack of continuity of care as a limiting factor (59%).

Table 1 describes the risk factors identified by nurses for the development of VTE.

Table 1: Risk factors for the development of cerebral thromboembolism. Rio de Janeiro, RJ, Brazil, 2023.

Risk factors	n	%
Limited ambulation	35	100
Bed immobilization	32	91
Estrogen-containing oral contraceptives	32	91
Postoperative	32	91
Smoking	31	89
Previous VTE	31	89
Varicose veins	30	86
Family history of VTE	29	83
Traveling seated for more than 6 hours	28	80
Pregnancy/Puerperium	28	80
Obesity	29	83
Neurological disease with paresis	27	77
Age (40 years or older)	25	71
Thrombophilia	24	69
Hospitalization	24	69
Trauma	23	66
Vascular devices	23	66
Cancer	22	63
Hormone replacement therapy	21	60
Diabetes	19	54
Acute diseases	19	54
Heart/respiratory failure	17	49
Use of chemotherapy	14	40
Infiltrative inflammatory disease	13	37
Nephrotic syndrome	11	31
Paroxysmal nocturnal hemoglobinuria	9	26

It was found that limited ambulation (n=35; 100%), bed rest (n=32; 91%), use of oral contraceptives containing (n=estrogen 32; 91%) and the postoperative period (n=32; 91%) were the most cited.

The signs and symptoms of deep vein thrombosis for nurses are presented in Table 2.

Table 2: Signs and symptoms of deep vein thrombosis.
Rio de Janeiro, RJ, Brazil, 2023.

Signs and symptoms	n	%
Calf pain/tenderness	34	97
Burning sensation in lower limbs	29	83
Hyperthermia in the region	25	71
Edema with pit formation	21	60
Erythema and discoloration	19	54
Edema in the inguinal region	14	40
Dilated superficial veins	14	40
Cyanosis	12	34
Anasarca	4	11

The most prevalent signs and symptoms of DVT were pain or tenderness in the calf (n=34; 97%) and a burning sensation in the lower limbs (n=29; 83%). Table 3 presents the data obtained on the signs and symptoms of pulmonary embolism.

Table 3: Signs and symptoms of pulmonary embolism. Rio de Janeiro, RJ, Brazil, 2023.

Signs and symptoms	n	%
Dyspnea	30	86
Tachypnea	27	77
Pleuritic or chest pain	27	77
Cyanosis	26	74
Tachycardia	25	71
Syncope	21	60
Cough	15	43
Sweating	14	40
Hemoptysis	9	26

It was observed that the signs and symptoms of pulmonary embolism most indicated by professionals were dyspnea (86%), tachypnea (77%) and pleuritic or chest pain (77%).

In the scales/scores used in clinical practice to assess the risk of venous thromboembolism, 18 correctly indicated at least one of the two scales presented in the questionnaire for this study (51%).

According to the data, early ambulation (91%) and the use of graduated compression stockings (89%) were the main non-pharmacological prophylactic measures mentioned by participants for the prevention of venous thromboembolism in patients. Regarding pharmacological prophylactic measures, the most cited were low molecular weight heparin (91%), oral anticoagulants (69%) and antiplatelet agents (66%).

In patients undergoing treatment for venous thromboembolism during hospitalization, 35 nurses reported incorporating into their practice the assessment of skin color and peripheral perfusion of limbs receiving compression treatment (100%). Regarding prophylaxis with anticoagulants, the results revealed that 31 nurses offered guidance on the use of anticoagulants and monitoring possible signs of bleeding (89%).

DISCUSSION

This study revealed that more than 80% of nurses in cardiology units did not participate in training to detect risk factors and implement prophylactic measures. Studies in the literature indicate that the existence of educational programs on VTE proportionally influences the increase in the implementation of prophylactic

measures by nurses, and that it is also necessary to encourage employee participation in training sessions to achieve the desired result¹⁰. The study by Ramalli Junior *et al.* demonstrated that continuing education was one of the determining factors for improvements in the implementation of VTE prophylaxis in patients at the institution studied¹².

The analysis of this study revealed that the lack of specific training on the subject is reflected in the tendency of participants to perform VTE risk assessment only in some patients. Ideally, all hospitalized patients should be stratified for risk of thromboembolic events and receive appropriate prophylaxis for prevention^{12,13}.

The lack of institutional protocols stood out as the main barrier. This finding is in line with data presented in the literature, which also indicate this as the main impediment to screening risk factors and implementing prophylactic measures^{6,8,10}.

Continuity of nursing care is intrinsically linked to the implementation of care in a cohesive, logical and timely manner by different professionals. This aspect has a direct impact on the quality of care, as it enables integrated care, strengthens the relationship between patients and professionals, reduces the inappropriate use of health services and reduces costs. On the other hand, fragmentation of care can result in confusing treatment instructions for the patient, increasing the likelihood of errors and duplication¹⁴.

Impaired walking and immobilization were the most frequently reported risk factors. In the literature, these factors are relevant because, according to pathophysiology, they cause vascular stasis and reduced blood flow and, consequently, favor the formation of thrombi¹⁵. There is still divergence in the literature regarding the definitions of immobility and the degree of contribution to the risk of VTE. The terms reduced mobility, prolonged immobility, bed confinement and rest with privilege of going to the bathroom are also used as synonyms for immobility¹⁶. Thus, the terms "impaired walking" and "immobilization" can be understood as belonging to the same category of risk factors.

The use of estrogen -based oral contraceptives was one of the most cited factors among professionals. This risk occurs due to changes in hemostasis, i.e., this hormone increases serum concentrations of coagulation factors and decreases anticoagulant factors¹⁷.

Pregnancy and the puerperium are significant risk factors for thromboembolic events. During pregnancy, the risk of VTE increases five to ten times, and can reach thirty-five times in the puerperal period compared to non-pregnant women of the same age group¹⁷. In this study, 80% of nurses identified pregnancy/puerperium as a risk factor, demonstrating the participants' recognition of the relevance of this factor.

Hormone replacement therapy (HRT) was indicated by 60% of professionals as a risk factor. Scientific literature indicates that the risks of HRT may exceed the benefits, however many women still receive estrogen to minimize climacteric symptoms. Data indicate that women who receive HRT are two to three times more likely to develop VTE than postmenopausal women¹⁷.

The postoperative period has been recognized as an important risk factor. Studies in the literature indicate that the incidence of symptomatic PE is higher in surgical patients than in patients admitted to the hospital. There is a high number of sudden deaths in the immediate postoperative period due to pulmonary embolism, often undiagnosed. The degree of risk among these patients varies according to the type of surgery, with orthopedic surgery being the highest risk for DVT in the absence of prophylaxis¹⁸.

Chemotherapy was mentioned by 40% of participants, demonstrating a lower frequency of recognition. However, it is important to emphasize that chemotherapy is associated with an increased risk of VTE due to its ability to decrease the body's natural anticoagulants (proteins C and S, antithrombin) and the release of factors that promote clotting when tumor cells are destroyed. In addition, cancer itself is a significant risk factor, since 50% of patients have abnormalities in one or more coagulation tests¹⁵.

Another risk factor that was rarely mentioned among participants, but considered relevant for the development of VTE, was heart/respiratory failure (49%). In the literature, these clinical conditions increase the risk of venous and pulmonary thromboembolic events¹⁵.

Prolonged hospitalization is an independent risk factor; literature data indicate that 60% of risk factors for VTE may be associated with the hospitalization process and surgical procedures^{6,19}. Hospitalization was cited by 69% of nurses as an important risk factor.

Most nurses (51%) reported knowing at least one scale for VTE stratification. It is recommended that risk classification occur upon admission and throughout the hospitalization period, since hospitalizations longer than four days favor the development of VTE¹⁵. The study by BARP et al.⁶ indicates that the assessment should be performed upon admission and every 72 hours, with the application of the Caprini risk score for this measurement.

Venous thromboembolism prevention can be pharmacological and mechanical²⁰. Mechanical prophylaxis acts to reduce venous stasis, increasing blood velocity in the vessels, decreasing vein diameter and controlling edema²⁰. The most cited prophylaxis was early ambulation (91%), which when implemented correctly, associated with anticoagulation, has a high cost-benefit, helping to prevent deaths, reduce hospital stay and accelerate recovery²¹.

Although it was rarely mentioned among study participants (37%), the vena cava filter is indicated for patients with already established DVT or with the presence of proximal venous thrombus, both with absolute contraindication to full anticoagulation²².

Pharmacological therapy is considered the basis of treatment for VTE. Nurses have important roles in this process. According to a previous study, nursing care related to drug therapy varies according to the medication used by the patient. However, regardless of the medication chosen, the professional has the role of providing guidance on the use of anticoagulants and assessing bleeding¹¹. This result is in line with the data from this study, in which 89% of participants indicated the same nursing care.

Among the care measures related to pharmacological treatment, the most cited were the assessment of skin color and peripheral perfusion of the limbs. In addition to these measures, the literature indicates in the treatment of VTE: "provide guidance on the complications of the disease; pay attention to the signs and symptoms of diseases and conditions associated with DVT; provide comfort and well-being; keep limbs elevated at 45 degrees; apply compression therapy with elastic stockings; observe and note the characteristics of the pain; administer analgesia as prescribed by the doctor; encourage active and/or passive movement in bed; observe and report the presence of bleeding; pay attention to the occurrence of thrombocytopenia"¹¹.

Study limitations

The limitations of this study include the fact that it was conducted in a single institution and that it was composed of a convenience sample, which prevents the data from being generalized. Another limitation is that the questionnaire was not validated for the specific target audience by experts in the field.

It is expected that this study can contribute substantially to the professional practice of nursing in the early recognition of VTE risks as well as in interventions and use of resources, with a view to providing safe and quality care.

CONCLUSION

The main challenges identified in this study for nurses' performance in recognizing risk factors, adopting prophylactic measures and treating patients with deep vein thrombosis and pulmonary embolism were the absence of a specific institutional protocol and the lack of training and qualifications focused on the subject. These findings reveal significant gaps in the organization of care, directly impacting the systematization of care practices and contributing to the lack of systematic risk classification by nursing professionals.

Although it was observed that most nurses recognize several risk factors and signs/symptoms related to venous thromboembolism, there are still weaknesses in the knowledge of relevant clinical elements, such as chemotherapy, hormone replacement therapy, heart or respiratory failure and presence of cyanosis — aspects that can compromise early identification and patient safety.

Therefore, the results of this study reinforce the urgency of developing and implementing a standardized institutional protocol, as well as offering continuing education programs focused on the management of venous thromboembolism. Similar studies are also encouraged in other health institutions with cardiology units, in order to broaden the understanding of the reality of professional practice and strengthen prevention and care strategies.

REFERENCES

1. Organização Pan-Americana de Saúde. Doenças cardiovasculares continuam sendo a principal causa de morte nas Américas. OPAS; 2021 [cited 2022 Jul 15]. Available from: <https://www.paho.org/pt/noticias/29-9-2021-doencas->

cardiovasculares-continuam-sendo-principal-causa-morte-nas-

americas#:~:text=Washington%2C%20DC%2C%2029%20de%20setembro,milh%C3%B5es%20de%20vidas%20cada%20ano.

2. Albricker ACL, Freire CMV, Santos SN, Alcantara ML, Saleh MH, Cantisiano AL et al. Joint Guideline on Venous Thromboembolism – 2022. *Arq. Bras. Cardiol.* 2022 [cited 2023 Aug 26]; 118 (4):797–857. DOI: <https://doi.org/10.36660/abc.20220372>.
3. Raymundo SRO, Lobo SMA, Hussain KMK, Hussein KG, Secches IT. What has changed in venous thromboembolism prophylaxis for hospitalized patients over recent decades: review article. *J. Vasc. Bras.* 2019 [cited 2022 Jul 15]; 18:e20180021. DOI: <https://doi.org/10.1590/1677-5449.002118>.
4. Rodrigues A, Advins AF, Rebelo A, Dias C, Novo R, Anjos S, Garrido A. Nurse's intervention in the prevention of deep venous thrombosis in the postoperative period: integrative review. *RIIS.* 2020 [cited 2022 Aug 26]; 3(2):87-99. DOI: <https://doi.org/10.37914/riis.v3i2.89>.
5. Galette J, Rotta CS, Lopes EFB, Menezes IR, Silva LSA, Ramos MF, et al. Risk of venous thromboembolism and adjustment of thromboprophylaxis in hospitalized clinical patients. *Braz. J. Develop.* 2021 [cited 2022 Jul 15]; 7(2):16975-93. DOI: <https://doi.org/10.34117/bjdv7n2-362>.
6. Barp M, Carneiro VSM, Amaral KVA, Pagotto V, Malaquias SG. Nursing care in the prevention of venous thromboembolism: an integrative review. *Rev. Eletr. Enferm.* 2018 [cited 2022 Aug. 20]; 20:14. DOI: <https://doi.org/10.5216/ree.v20.48735>.
7. Gomes ET, Assunção MCT, Lins EM, Püschel VAA. Nursing in mechanical prevention of venous thromboembolism in surgical patients. *Rev Esc Enferm USP.* 2021 [cited 2022 Jul 15]; 55:e03738. DOI: <https://doi.org/10.1590/S1980-220X2020002703738>.
8. Gomes IFP, Freitas SCG, Almeida CS, Miranda CJCP, Silva PES. Prophylaxis of deep vein thrombosis in the hospital environment. *REAS.* 2023 [citado 2025 Apr 10]; 23(4):e11829. DOI: <https://doi.org/10.25248/reas.e11829.2023>.
9. Soares AF, Pereira JA. Análise da trombopprofilaxia em um hospital de urgências em Goiás. *RESAP.* 2024 [cited 2025 Apr 10]; 10. Available from: <https://www.revista.esap.go.gov.br/index.php/resap/article/view/822>.
10. Silva JS, Lee JA, Grisante DL, Lopes JL, Lopes CT. Nurses' knowledge, risk assessment, and self-efficacy regarding venous thromboembolism. *Acta Paul Enferm.* 2020 [cited 2023 Dec 09]; 33:eAPE20190125. DOI: <https://doi.org/10.37689/acta-ape/2020AO0125>.
11. Gusmão LG, Silva LX, Azevedo AS. Assistência de enfermagem no tratamento da trombose venosa profunda em pacientes críticos. *POBS.* 2014 [cited 2023 Nov 09]; 4(15):50-60. Available from: https://ojs3.perspectivasonline.com.br/biologicas_e_saude/article/view/533.
12. Ramalli Junior EL, Dallo MB, Joviliano EE. Adequacy of venous thromboembolism risk stratification and prophylaxis in a tertiary university hospital. *J Vasc Bras.* 2023 [cited 2023 Nov 09]; 22:e20230007. DOI: <https://doi.org/10.1590/1677-5449.202300071>.
13. Rodrigues FA, Waters C. Risk factors and prophylaxis of methods for venous thromboembolism in hospitalized patient. *Arq Med Hosp Fac Cienc Med Santa Casa São Paulo.* 2022 [cited 2023 Nov 09]; 67:e026. DOI: <https://doi.org/10.26432/1809-3019.2022.67.026>.
14. Mendes FRP, Gemito MLGP, Caldeira EC, Serra IC, Casas-Novas MV. A continuidade de cuidados de saúde na perspectiva dos utentes. *Ciênc. saúde colet.* 2017 [cited 2024 Jan 05]; 22(3):841-53. DOI: <https://doi.org/10.1590/1413-81232017223.26292015>.
15. Costa MT, Ferreira GM, Barros LM. Deep venous thrombosis related to the pregnancy-puerperal cycle and physiopathological changes with the advent of COVID-19. *RSD.* 2021 [cited 2022 Oct 08]; 10(15):e309101523097. DOI: <https://doi.org/10.33448/rsd-v10i15.23097>.
16. Ye F, Bell LN, Mazza J, Lee A, Yale SH. Variation in definitions of immobility in pharmacological thromboprophylaxis clinical trials in medical inpatients: a systematic review. *Clin Appl Thromb Hemost.* 2018 [cited 2025 Apr 21]; 24(1):13-21. DOI: <http://dx.doi.org/10.1177/1076029616677802>.
17. Oliveira ALML, Paschôa AF, Marques MA. Venous thromboembolism in women: new challenges for an old disease. *J Vasc Bras.* 2020 [cited 2023 Nov 09]; 19:e20190148. DOI: <https://doi.org/10.1590/1677-5449.190148>.
18. Araújo WEC, Nascimento LC, Lima EL. Eficácia, segurança e tolerabilidade da enoxaparina para prevenção de tromboembolismo venoso nas cirurgias eletivas de abdome, pelve e varizes: revisão rápida de evidências. *RESAP.* 2023 [cited 2023 Dec 27]; 9(9a4):1-15. Available from: <https://www.revista.esap.go.gov.br/index.php/resap/article/view/572/272>.
19. Kernitskei J, Bertoncello KCG, Jesus SC. Prevalência dos fatores de risco para trombose venosa profunda em pacientes cirúrgicos em uma unidade de terapia intensiva. *Arq. Ciênc. Saúde Unipar.* 2021 [cited 2025 Apr 10]; 25(3):175-83. Available from: <https://www.revistas.unipar.br/index.php/saude/article/view/8243>.
20. Flâmia BI, Souza FM, Silva JC, Lima LF, Tomaz MVS, Neto MSPet al. Prophylaxis of venous thromboembolism in surgical patients. *REAS.* 2021 [cited 2022 Oct 08]; 13(4):e6878. DOI: <https://doi.org/10.25248/reas.e6878.2021>.
21. Lima LSC, Oliveira DS, Rocha JO, Mendes KM. Role of the nurses in the prophylaxis of venous thromboembolism in surgical patients. *EJCH.* 2025 [cited 2025 Apr 21]; 25:e19248. DOI: <https://doi.org/10.25248/reas.e19248.2025>.
22. Renni MJP, Bergmann A, Melo AC. Placement of inferior vena cava filter: clinical and prognostic characteristics of cancer patients at INCA. *Rev. Bras. Cancerol.* 2020 Dec. 28 [cited 2025 Apr. 10]; 67(1):e-01841. DOI: <https://doi.org/10.32635/2176-9745.RBC.2021v67n1.841>.

Author's contributions

Conceptualization, J.F.P. y A.L.C.M.; methodology, J.F.P. y A.L.C.M.; formal analysis, J.F.P. y A.L.C.M.; investigation, J.F.P. y A.L.C.M.; resources, J.F.P. y A.L.C.M.; data curation, J.F.P. y A.L.C.M.; manuscript writing, J.F.P., A.L.C.M.; K.B.S.A., R.M.N.; L.F.A. y A.S.F.; review and editing, K.B.S.A., R.M.N.; L.F.A. y A.S.F.; visualization, K.B.S.A., R.M.N.; L.F.A. y A.S.F.; supervision, A.L.C.M.; project administration, J.F.P. y A.L.C.M.; financing acquisition, A.L.C.M. All authors read and agreed with the published version of the manuscript.



Research Article
Artigo de Pesquisa
Artículo de Investigación

Pereira JF, Marins ALC, Andrade KBS, Nepomuceno RM, Almeida LF, Franco AS
Nurses in the evaluation of venous thromboembolism

DOI: <https://doi.org/10.12957/reuerj.2025.82565>

Use of artificial intelligence tools

The authors declare that no artificial intelligence tools were used in the composition of the manuscript “*Nurses' knowledge about the assessment and therapeutic plan of patients at risk of venous thromboembolism*”.