

Nurses' knowledge, risk assessment, and self-efficacy regarding venous thromboembolism

Conhecimento, avaliação de risco e autoeficácia quanto a tromboembolismo venoso entre enfermeiros
 Conocimientos, evaluación de riesgos y autoeficacia sobre tromboembolismo venoso entre enfermeros

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Abstract

Objectives: To compare nurses' self-perceived and objective knowledge of venous thromboembolism, and to identify their risk assessment practices and perceived barriers, and self-efficacy in delivering care to prevent venous thromboembolism.

Methods: A cross-sectional, descriptive study including bedside nurses working in adult units at a teaching hospital in the city of São Paulo. Nurses answered a questionnaire on self-perceived and objective knowledge, risk assessment, self-efficacy, and barriers to venous thromboembolism risk assessment, which was developed and refined by nurses and physicians with academic and clinical expertise. Data were analyzed using descriptive statistics (absolute and relative frequencies).

Results: Out of 81 nurses, 53.3% perceived their own knowledge of venous thromboembolism risk assessment as good, however, only an average of 33.1% of nurses answered objective questions about the disease correctly; and 44.4% performed risk assessment for only a few patients. The most common barrier for risk assessment was the lack of protocol (65.4%), followed by the lack of time (29.6%). Regarding self-efficacy, only 13% to 24.3% were sure most of the time that they could prevent venous thromboembolism and educate patients for prevention.

Conclusion: A gap between self-perceived and objective knowledge of venous thromboembolism was identified, and risk assessment was considered insufficient. Nurses had low risk assessment self-efficacy. The lack of a protocol is perceived as a significant barrier for assessment. These results may support individual planning of permanent education focusing on disease prevention.

Resumo

Objetivo: Comparar o conhecimento autopercebido e objetivo de enfermeiros sobre tromboembolismo venoso e identificar suas práticas e barreiras percebidas para a avaliação de risco e autoeficácia em realizar cuidados preventivos para a doença.

Métodos: Estudo descritivo transversal realizado com enfermeiros assistenciais lotados nas unidades nos setores de cuidados a pacientes adultos de um hospital-escola da cidade de São Paulo. Os enfermeiros responderam a um instrumento sobre conhecimento percebido e objetivo, avaliação de risco, autoeficácia e barreiras para avaliação de risco de tromboembolismo venoso, o qual foi elaborado e refinado por enfermeiros e médicos com *expertise* acadêmica e clínica. Os dados foram analisados por estatística descritiva (frequências absolutas e relativas).

Resultados: Dos 81 enfermeiros, 53,3% percebiam seu conhecimento sobre avaliação de risco de tromboembolismo venoso como "bom", porém 33,1% em média responderam corretamente a questões

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objetivas sobre a doença; 44,4% realizavam avaliação de risco em apenas alguns pacientes. A barreira mais comum para avaliação do risco foi falta de protocolo (65,4%), seguida de falta de tempo (29,6%). Em relação à autoeficácia, somente 13% a 24,3% se sentem seguros a maior parte do tempo em prevenir e orientar pacientes quanto à prevenção de tromboembolismo venoso.

Conclusão: Há discrepância entre o conhecimento percebido e objetivo sobre tromboembolismo venoso e a avaliação de risco é insuficiente. Os enfermeiros têm baixa autoeficácia quanto à avaliação de risco. A falta de protocolo é percebida como barreira importante para essa avaliação. Esses resultados podem subsidiar o planejamento individual de educação permanente focada na prevenção da doença.

Resumen

Objetivo: Comparar el conocimiento autopercebido y objetivo de enfermeros sobre tromboembolismo venoso e identificar las prácticas y barreras percibidas para evaluar el riesgo y la autoeficacia de cuidados preventivos para la enfermedad.

Métodos: Estudio descriptivo transversal realizado con enfermeros asistenciales destinados a unidades en sectores de cuidados a pacientes adultos en un hospital universitario de la ciudad de São Paulo. Los enfermeros respondieron un instrumento sobre conocimientos percibidos y objetivos, evaluación de riesgos, autoeficacia y barreras para evaluar el riesgo de tromboembolismo venoso, que fue elaborado y refinado por enfermeros y médicos con *expertise* académica y clínica. Los datos fueron analizados por estadística descriptiva (frecuencias absolutas y relativas).

Resultados: De los 81 enfermeros, el 53,3% percibió que sus conocimientos sobre evaluación de riesgos de tromboembolismo venoso eran "buenos", pero un promedio de 33,1% respondió correctamente las preguntas objetivas sobre la enfermedad y el 44,4% realizaba evaluación de riesgos solo en algunos pacientes. La barrera más común para evaluar los riesgos fue la falta de protocolo (65,4%), seguida de la falta de tiempo (29,6%). Respecto a la autoeficacia, solamente entre el 13% y el 24,3% se siente seguro la mayor parte del tiempo para prevenir y orientar pacientes sobre la prevención de tromboembolismo venoso.

Conclusión: Hay discrepancias entre el conocimiento percibido y objetivo sobre tromboembolismo venoso y la evaluación de riesgos es insuficiente. Los enfermeros tienen una autoeficacia baja respecto a la evaluación de riesgos. La falta de un protocolo se percibe como barrera importante para esta evaluación. Estos resultados pueden contribuir a la planificación individual de educación permanente centrada en la prevención de la enfermedad.

Introduction

Venous thromboembolism (VTE) is the world's third leading cause of mortality, with an annual incidence ranging from 0.75 to 2.69 cases per 1,000 individuals in the European, North American, South American, and Australian populations. This disease incidence increases to 2 to 7 cases among individuals over 70 years old per 1,000 individuals. When associated with hospitalization, VTE increases hospital length of stay and mechanical ventilation duration, and it is the leading cause of lost disability-adjusted life years.⁽¹⁻³⁾ In Latin America, VTE-associated in-hospital mortality rates reach 14.1% in Brazil and 19% in Argentina.⁽⁴⁾

In this context, preventing in-hospital VTE must be a priority of health care teams. Prophylactic measures must be taken according to the identified VTE risk and may include but are not limited to ambulation, intermittent pneumatic compression of the lower extremities, graduated compression stockings, unfractionated heparin, low molecular weight heparin, oral anticoagulants.⁽⁵⁾

However, studies have shown low implementation of prophylactic measures for in-hospital VTE. In Jordan, VTE prophylaxis was properly implemented in only 35.1% of 456 hospitalized patients.⁽⁶⁾ In an Irish hospital, only 64.0% of sur-

gical patients and 47.0% of medical patients at risk of VTE received adequate prevention VTE care.⁽⁷⁾ In Portugal, 67.2% of hospitalized patients received VTE prophylaxis.⁽⁸⁾

In Brazil, a study conducted in a public teaching hospital in the city of São Paulo, including 369 patients, found that all patients had at least one VTE risk factor, but pharmacologic prophylaxis was implemented to only 70.3% high-risk patients with no contraindication, while mechanical prophylaxis was provided for only one of the patients with contraindication.⁽⁹⁾ In a private hospital in the same city, professional adherence to a VTE prevention protocol increased from 63.8% to 75.0% after implementing permanent education measures.⁽¹⁰⁾ A different study conducted in a non-metropolitan city in the state of São Paulo found the lack of adherence to a VTE prevention protocol of 38.9%, resulting in an additional monthly cost of R\$180.40.⁽¹¹⁾

Even though nurses do not prescribe pharmacologic prophylaxis for VTE, they do perform risk assessment, patient and family education on these risks, and anticoagulant therapy management upon transitioning from the hospital to other health care settings.^(12,13) Therefore, the fulfillment of these duties may be positively or negatively impacted by gaps between nurses' self-perceived and objective

knowledge, self-efficacy, and perceived barriers to risk assessment and VTE prevention.^(12,14)

Whereas objective knowledge is that assessed via standardized scores or supervisor-attributed grading based on answers to questions or tests, self-perceived knowledge is the individual's assessment of their own level of knowledge.⁽¹⁵⁾ Self-efficacy refers to the belief in one's own capacity to organize and execute the necessary courses of action to reach certain outcomes.⁽¹⁶⁾ Perceived barriers, in turn, consist of a cost-benefit analysis conducted by individuals to weight a beneficial action and its counter-limitations, such as the necessary time to perform a given action.⁽¹⁷⁾

A study conducted in California, USA, found that American nurses had a high level objective knowledge on VTE risk factors, but less knowledge about prophylaxis for the disease and its signs and symptoms. In addition, upon investigating their self-efficacy, only 50% of healthcare providers believed themselves capable of conducting the proper mechanical prophylaxis. When questioned about their skills for educating at-risk patients, the percentage dropped to less than a fourth of healthcare providers.⁽¹²⁾

Despite previous Brazilian studies assessing provider adherence to VTE prophylactic measures,⁽⁹⁻¹¹⁾ there are no national studies comparing self-perceived to objective VTE knowledge in nurses, as well as their practices and perceived barriers to risk assessment and self-efficacy for VTE prevention. Their assessment is relevant in order to guide educational measures towards the factors that may negatively impact the final outcome of VTE prophylactic actions. The objectives of this study were to compare nurses' self-perceived and objective knowledge of VTE, and to identify their risk assessment practices and perceived barriers, and self-efficacy in delivering care to prevent venous thromboembolism.

Methods

This study was divided into two phases:

Phase 1) Development and content refinement of the data collection questionnaire: VTE knowledge,

VTE risk assessment practices, perceived barriers to VTE risk assessment, and VTE prevention self-efficacy.

A data collection questionnaire was developed based on the one used by Lee et al.⁽¹²⁾ in their study performed in California, USA, which consisted of the same objectives. The questionnaire was originally developed by experts on VTE research and instrument development, and revised for clarity and completeness by an interdisciplinary committee on anticoagulation education.

The questionnaire consists of the following five parts (please see the "Initial questionnaire items" column, Appendix 1):

- A. Participation and opinion on the quality of current education programs on VTE risk, prevention, and assessment.
- B. VTE perceived knowledge and risk assessment practices.
- C. Perceived barriers to VTE risk assessment.
- D. Self-efficacy on VTE prevention and patient education practices.
- E. Objective knowledge of VTE risk, diagnosis, and treatment.

Once developed, the questionnaire was submitted to a group of healthcare providers—the instrument's judges—with a minimum education level of Master's, which were selected based on their VTE-related specialties (Cardiovascular, Vascular, and Pulmonology). Four nurses specializing in cardiovascular nursing, a vascular surgeon, and a pulmonologist were invited to participate via e-mail. One of the nurses had an Master's degree and the remaining three nurses had PhDs, all with a minimum clinical experience of five years, alongside teaching and research experience. Both physicians had PhDs, with clinical, teaching, and research experience.

The professionals assessed the instrument's items based on:

- Clarity (the item was developed in a way that its content was understandable and properly expressed what it was meant to measure): clear or unclear.⁽¹⁸⁾
- Theoretical relevance (the item reflects cognitive processes of interest): irrelevant or relevant.⁽¹⁸⁾
- Practical relevance (the item reflects the proper concepts, it is relevant and adequate for the at-

tainment of the proposed objectives): irrelevant or relevant.⁽¹⁸⁾

Judges were given 60 days to complete the forms. Items considered unclear or irrelevant by any judge were revised and adjusted accordingly by researchers.

The number of judges was determined according to Cassepp-Borges et al.,⁽¹⁹⁾ which considered six to be the minimum number of specialists for this type of assessment. It should be noted that no transcultural adaptation study nor validation of health measurement instruments was conducted, because this was a data collection questionnaire pertaining to this study's specific purposes alone. This was not an instrument whose aim was to represent the measurement of its constructs across settings.

Phase 2) Assessment of hospital nurses' VTE knowledge, VTE risk assessment practices, perceived barriers to VTE risk assessment, and self-efficacy for VTE prevention.

A cross-sectional, analytical study was conducted in a public extra-large teaching hospital in the city of São Paulo. The convenience sample consisted of bedside nurses working in medical or surgical adult units. Nurses who were inactive during the data collection period due to a leave of absence or vacation leave were excluded from the sample, as well as those in diagnostic units, sterilization of materials and infection control services.

Nurses were interviewed in their respective units from January to May 2019, in four different shifts (mornings, afternoons, nights or even days, and nights on odd days) by a 6th semester undergraduate nursing student, who explained the objectives of study and invited the nurses to participate.

Those who accepted to join the study answered the data collection questionnaire developed in phase 1, either in print or electronically, via Google Forms. Documents were to be handed in/answered in up to seven days. The best date and time for collection of the completed instrument in print within this period was agreed individually between the nurse and the researcher. Nurses who did not complete the instrument in print or who did not answer the digital document within the established period were excluded.

Data were stored in a Microsoft Office Excel spreadsheet and analyzed by descriptive statistics. Quantitative variables are shown as mean±standard deviation or median and minimum and maximum values. Qualitative variables are shown as absolute (n) and relative (%) frequencies.

This study was approved by the hospital's Teaching and Research Committee where data were collected, as well as the Research Ethics Committee (Protocol no. 2.795.754) of Universidade Federal de São Paulo. Confidentiality was guaranteed to judges and bedside nurses. All participants signed the informed consent forms.

Results

In Phase 1, the data collection questionnaire was developed and refined by judges. Six judges were invited and all accepted to participate, and delivered the instrument completed. Appendix 1 (Chart 1) shows the questionnaire's initial items, the number of judges who considered them unclear or irrelevant, and the questionnaire's final items after the suggested modifications. Regarding clarity, there were no conceptual changes: all suggestions were related to minor language changes and abbreviations.

In Phase 2, 276 nurses were invited to participate, out of which 5 refused, 81 completed the questionnaire, and 190 did not complete the questionnaire. Most subjects were women (73.3%) with a mean age of 34.0±7.9 years.

Most nurses had a specialist degree as their highest level of education, medical and surgical experience, and a wide variation in length of time in the profession, length of time working in the hospital, and length of time working on their respective units. Only 40% had taken part in education programs on VTE risk, prevention, and assessment (Table 1).

Self-perceived knowledge, practices, and perceived barriers for VTE risk assessment

Most nurses considered their knowledge of VTE risk assessment as good, performed thorough VTE risk assessment in only a few patients, and consid-

Table 1. Bedside nurses' Professional characteristics and self-perceived knowledge of VTE risk assessment, performance of a thorough VTE risk assessment, and barriers to thorough VTE risk assessment

Variable	Measures n(%)
Highest educational level	
Specialization	63(77.8)
BSN/License Degree	11(13.6)
Master's	6(7.4)
PhD	1(1.2)
Unit	
Medical intensive care unit	22(27.2)
Medical floor	17(21.0)
Surgical floor	17(21.0)
Surgical intensive care unit	15(18.5)
Emergency room	6(7.4)
Obstetrics and gynecology	4(4.9)
Participation on in-service educational programs on VTE risk, prevention, and assessment.	32(40.0)
Quality of educational program	
Poor	4(12.5)
Regular	1(3.1)
Good	4(12.5)
Very good	22(68.8)
Excellent	1(3.1)
Length of time in the profession, months, median (min-max)	84(1-360)
Length of time working in the hospital, months	48(1-432)
Length of time working on the unit, months	36(1-288)

*Percentage computed considering the 32 nurses who had participated in educational programs.

ered the lack of a standardized protocol the main barrier to VTE risk assessment. More than one barrier could be selected by participants (Figure 1).

Self-efficacy for VTE prevention and patient education practices

The overall mean values of self-efficacy for VTE prevention and patient education practices was 3.2 ±1.1 out of a maximum of 5. Most nurses were sure about their practices most of the time. The practice showing the lowest mean score was using mechanical devices for VTE prevention, and the practices showing the highest mean scores were encouraging early mobilization and lower extremities exercise (Figure 2).

Objective knowledge of VTE risk, diagnosis, and treatment

Figure 3 shows data on nurses' knowledge (measured by questions 6 through 21, please see "Initial questionnaire items" column, Appendix 1) of VTE risk, diagnosis, and treatment. The overall mean percentage of questions answered correctly was 33.1±19.6%.

Less than half of the nurses answered correctly the questions 9 (nearly all hospitalized patients are at risk for VTE), 12 (recent surgery is a contraindication for pharmacological prophylaxis with unfractionated heparin or low molecular weight heparin), 17 (enoxaparin is associated with a lower

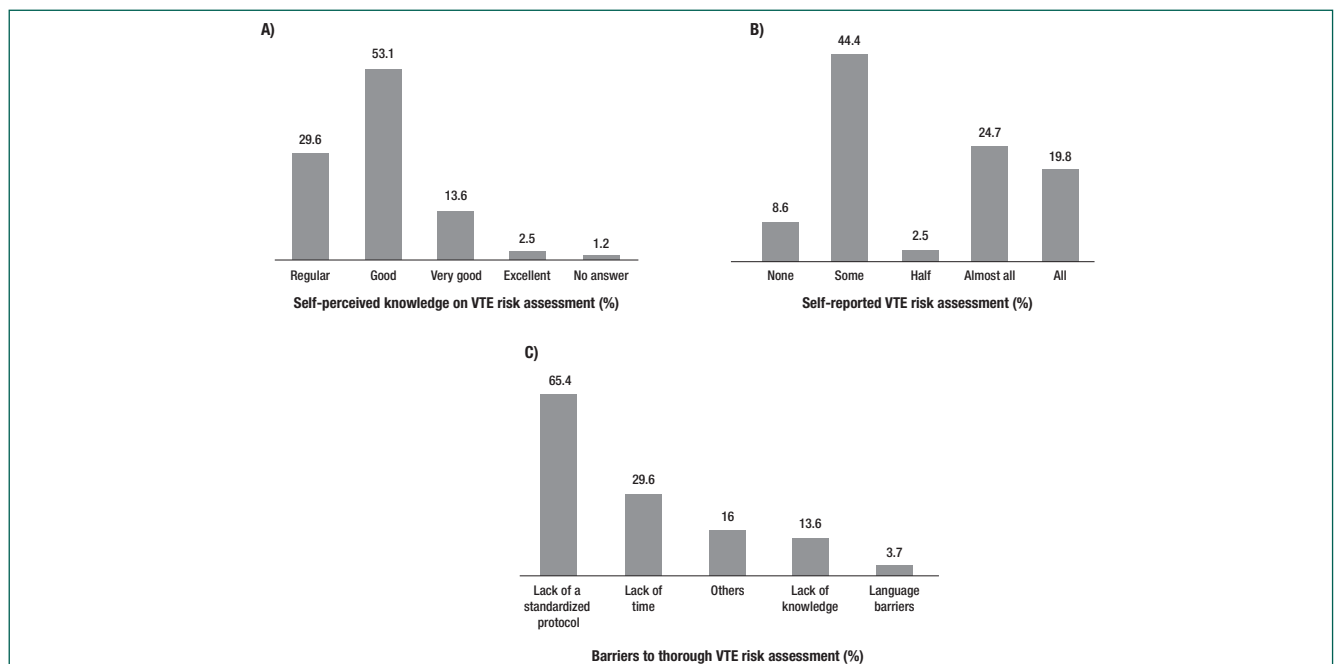


Figure 1. Bedside nurses' self-perception of a) knowledge of VTE risk assessment, b) performance of a thorough VTE risk assessment, and c) barriers to thorough VTE risk assessment.

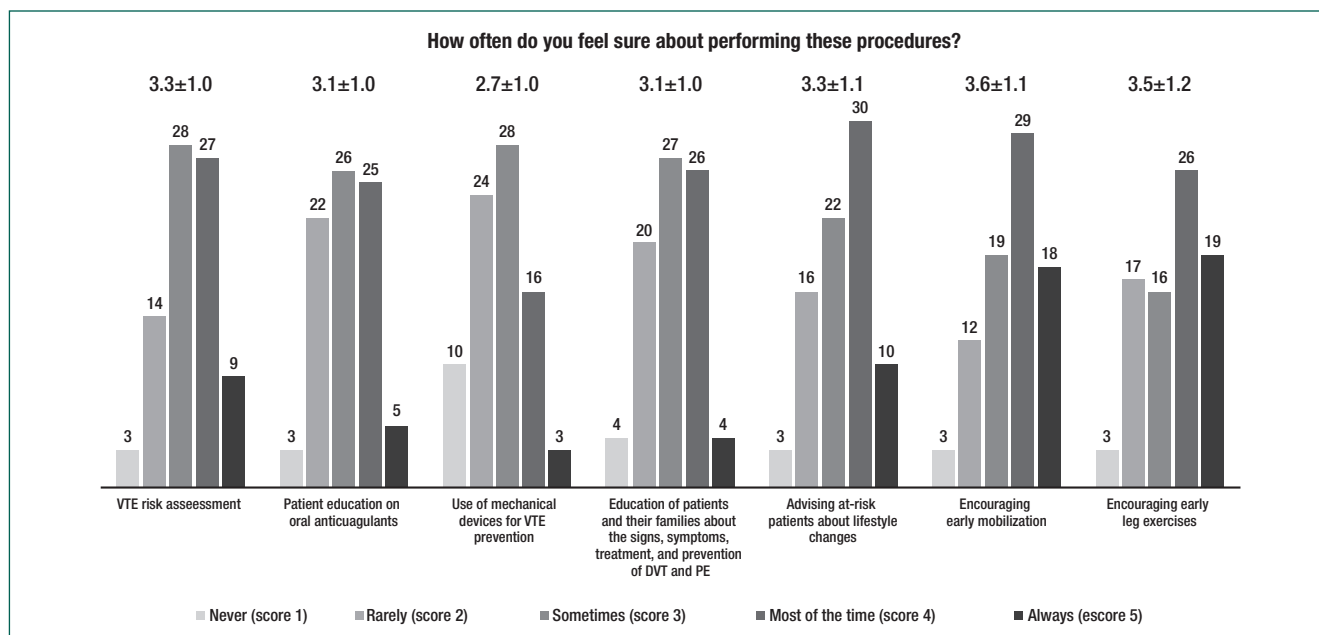


Figure 2. Bedside nurses' self-efficacy for venous thromboembolism prevention and patient education practices (n=81)

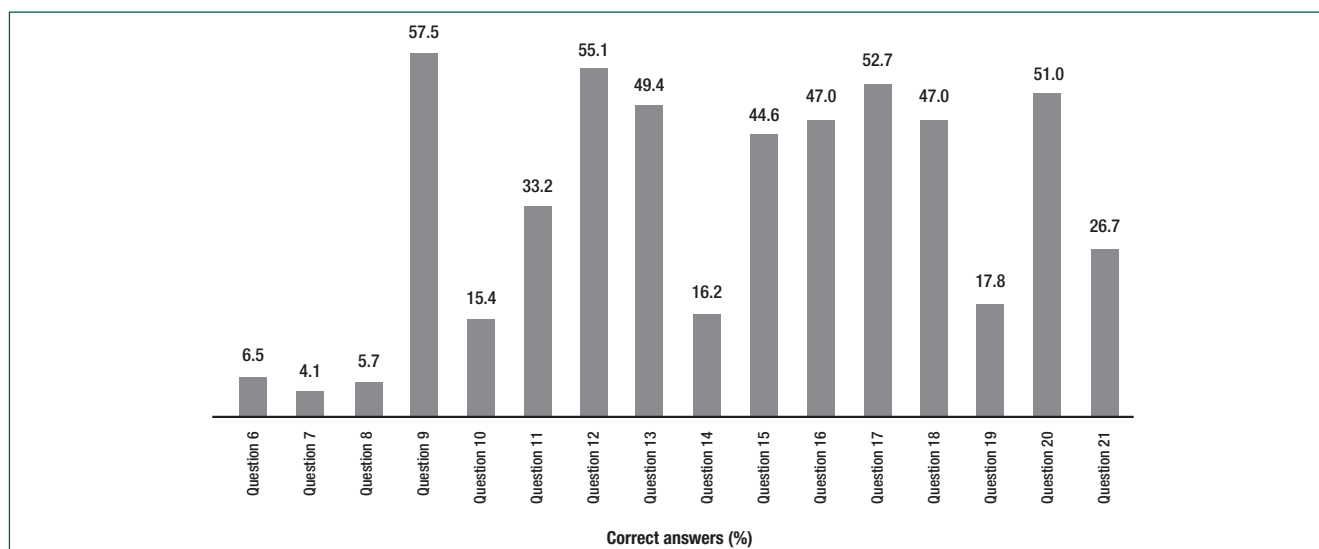


Figure 3. Nurses' objective knowledge of venous thromboembolism risk, diagnosis, and treatment

incidence of thrombocytopenia as compared to unfractionated heparin), and 20 (which of the following tests is indicated for the initial diagnosis of deep vein thrombosis?).

Less than half of the sample answered correctly the questions 13 (is central nervous system surgery over the previous 24 hours an absolute contraindication to heparin prophylaxis?), 15 (is a 35-year-old patient without previous history hospitalized after inguinal hernia correction at risk for venous throm-

boembolism?), 16 (aspirin is acceptable as an alternative to heparin for pharmacologic prophylaxis), and 18 (warfarin [oral anticoagulant] interacts with many other drugs, such as aspirin and ibuprofen).

Questions 6 (what are the risk factors for venous thromboembolism?), 7 (what are the signs and symptoms of deep vein thrombosis?), and 8 (what are the signs and symptoms of pulmonary embolism?) obtained the lowest rates of correct answers (4.1% to 6.5%).

Discussion

The use of VTE prevention measures positively impacts disease-related mortality, length of hospitalization, and incurred expenses due to undesirable events.⁽¹⁸⁾ The lack of translation of prophylaxis guidelines to in-hospital medical practice may be due to inadequate VTE knowledge, low self-efficacy, and barriers perceived by nurses.^(12,14,20)

This study found that more than half of bedside hospital nurses perceived their own knowledge of VTE risk assessment as good, however, only an average of 33.1% nurses answered our objective VTE questions correctly and less than a third of nurses were sure most of the time that they could prevent and educate patients on VTE prevention. Most nurses performed risk assessment in only a few patients and considered the main barriers to assessment to be the lack of a protocol and the lack of time.

Having 40% of our sample participate in the in-service education programs on VTE risk, prevention, and assessment—out of which nearly 70% considered the quality of information as excellent—may have influenced a predominant result of good for self-perceived knowledge. In fact, previous studies show that low participation in the in-service education programs is associated with negative self-perceived knowledge,⁽¹⁴⁾ whereas high participation in these programs is related to a positive self-perceived knowledge.⁽¹²⁾

In addition to improve self-perceived knowledge, continuing nursing education is associated with greater objective knowledge of thromboprophylaxis.⁽²¹⁾ However, despite the predominant good result for perceived knowledge in our sample, the proportion of correct answers to the objective VTE questions was under 60%, which indicates improper objective knowledge. This gap may account for nurses apply VTE risk assessment for only few patients. In agreement with our data interpretation, the literature points out that objective knowledge and perceived knowledge have low correspondence, albeit in different settings.⁽¹⁵⁾ Differences between perceived and objective knowledge are also shown by the fact that only 13.6% of nurses considered

the lack of knowledge as a barrier to VTE risk assessment.

In the hospital setting, approximately 50% of patients may present with concurrent deep vein thrombosis (DVT) and pulmonary embolism (PE). In addition, symptomatic DVT patients may present with silent PE, while PE patients may present with asymptomatic DVT.⁽²²⁾ In our sample, the lack of objective knowledge was identified mainly regarding VTE risk factors, signs, and symptoms. This lack of knowledge may prevent nurses from recognizing the development of PE in DVT patients, as well as the development of DVT in PE patients.

Data from our sample suggest that education programs on VTE risk, prevention, and treatment, if frequently performed and associated with attractive teaching strategies, may be positive. Published literature shows that use of VTE prophylaxis is dramatically influenced by evidence-based nursing interventions. When institutions offer medical education programs and follow-up on the results, adherence to prophylaxis increases.⁽²³⁾ For this reason, the institution may need to revisit currently offered education programs, as well as reinforce the relevance of participating in these activities.

The low level of objective knowledge among nurses associated with low self-efficacy on VTE prevention may constitute a considerable obstacle to prevent the disease.⁽¹⁴⁾ Self-efficacy was low among nurses in our study, mainly regarding the use of mechanical devices for VTE prevention. This result differs from the one seen in an American study⁽¹²⁾ and a Korean study,⁽¹⁴⁾ in which 50% and 84% of nurses were either always or most of the time sure that they could use mechanical VTE prevention devices.

Different from previously mentioned studies,^(12,14) nurses may have lacked confidence in performing mechanical prophylaxis because this study is a set within a public teaching hospital, which faces a paucity/lack of resources. In agreement with these results, studies show that mechanical VTE prophylaxis is less frequently performed.^(5,6) Encouraging early mobilization and leg exercise for was the practice nurses felt more

sure about in our study, which may be due to the fact that this measure is not contingent on any additional resource.

Published literature shows that introducing medical protocols may positively impact nurses' VTE knowledge.⁽²⁴⁾ In addition, having dedicated nurses to VTE prevention is an effective measure to increase thromboprophylaxis. In a study with nearly 9,000 medical patients in 15 Australian hospitals, a full-time educator nurse instituted an education program on the use of VTE prophylaxis measures including education sessions, written and verbal reminders, auditing, and result feedback. A 5.3% increase in prophylaxis protocols was found between audits, as well as a 42% increase in the probability of managing high-risk VTE patients as per evidence-based recommendations.⁽²⁵⁾ In this sense, the lack of an institutional protocol and the lack of time, pointed out in our sample as barriers to VTE assessment, show that the institution has failed to prioritize VTE risk.

The following limitations should be considered in our study: it was conducted in a single institution with a convenience sample and a high participation refusal rate, which makes it impossible to generalize these results to institutions at large. Given that nurses who were not sure about themselves would tend to refuse participating, there might be an overestimation of actual levels in the general population. Additionally, once the questionnaire could be answered in up to seven days, nurses may have checked literature references, which may also have lead to overestimation.

Our results are based on nurses' self-reporting, which may be affected by memory flaws and misinterpretation of questions. However, to the best of our knowledge, this is the first Brazilian study to cover a comparison between nurses' self-perceived and objective knowledge, self-efficacy, and perceived barriers to VTE risk assessment.

The reproduction of this study in other hospitals is encouraged, given the high variability in professional profiles among different institutions. Its results may support individual planning of permanent education focusing on VTE prevention. Particularly, this study shows the need for prioritiz-

ing the creation of institutional protocols standardizing VTE risk assessment for all patients, which could potentially impact self-efficacy in nurses and bridge the gap between objective and perceived knowledge.

Conclusion

Most nurses perceived their own knowledge of VTE risk assessment as good, but the measures of objective knowledge were low. The majority of nurses performed risk assessment in only a few patients, mainly due to the lack of a standardized protocol and the lack of time. Self-efficacy on risk assessment, education, and performing mechanical prophylaxis was low.

Collaborations

Silva JS, Lee Jung-Ah, Grisante DL, Lopes JL, and Lopes CT contributed to the study design, data analysis and interpretation, drafting of the paper, critical content review, and approval of the final version to be published.

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Appendix 1. initial questionnaire items, number of judges who considered them unclear or irrelevant, and final questionnaire items after the suggested modifications (n=6)

Initial questionnaire items	Unclear (n)	Irrelevant (theory) (n)	Irrelevant (practice) (n)	Final questionnaire items
Please answer the following questions by choosing the answers that best describe your practice and the practice of other nurses on your unit, without checking any references.	1	0	1	Please answer the following questions by choosing the answers that best describe your practice and the practice of other nurses on your unit.
1. Have you participated in in-service courses or education providing information on venous thromboembolism (VTE) assessment and risk prevention? [] Yes [] No	1	0	0	1. Have you participated in in-service courses or education providing information on venous thromboembolism assessment and prevention? [] Yes [] No
1-1. If yes, how would you classify the quality of information received? [] Poor [] Regular [] Good [] Very good [] Excellent	2	0	0	1-1. If yes, considering your knowledge of venous thromboembolism, how would you classify the quality of information received? [] Poor [] Regular [] Good [] Very good [] Excellent

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Continuation.

<p>2. How would you assess your overall knowledge of venous thromboembolism (VTE) risk assessment?</p> <p><input type="checkbox"/> Poor <input type="checkbox"/> Regular <input type="checkbox"/> Good <input type="checkbox"/> Very good <input type="checkbox"/> Excellent</p>	<p>1</p>	<p>0</p>	<p>0</p>	<p>2. How do you assess your overall knowledge of venous thromboembolism risk assessment?</p> <p><input type="checkbox"/> Poor <input type="checkbox"/> Regular <input type="checkbox"/> Good <input type="checkbox"/> Very good <input type="checkbox"/> Excellent</p>
<p>3. How often do you perform thorough VTE risk assessment for your patients?</p> <p><input type="checkbox"/> For none of my patients <input type="checkbox"/> For few of my patients <input type="checkbox"/> For half of my patients <input type="checkbox"/> For nearly all of my patients <input type="checkbox"/> For all of my patients</p>	<p>4</p>	<p>0</p>	<p>1</p>	<p>3. In how many of your patients do you perform thorough venous thromboembolism risk assessment?</p> <p><input type="checkbox"/> None of my patients <input type="checkbox"/> Few of my patients <input type="checkbox"/> Half of my patients <input type="checkbox"/> Nearly all of my patients <input type="checkbox"/> All of my patients</p>
<p>4. What barriers do you face when performing VTE risk assessment?</p> <p><input type="checkbox"/> Lack of time <input type="checkbox"/> Lack of knowledge <input type="checkbox"/> Language barriers <input type="checkbox"/> Lack of a standardized protocol <input type="checkbox"/> Other</p>	<p>1</p>	<p>0</p>	<p>0</p>	<p>4. What barriers do you face when performing a venous thromboembolism risk assessment? Please check all that apply.</p> <p><input type="checkbox"/> Lack of time <input type="checkbox"/> Lack of knowledge <input type="checkbox"/> Language barriers <input type="checkbox"/> Lack of a standardized protocol <input type="checkbox"/> Other</p>
<p>5. How would you assess the VTE risk assessment knowledge of the other nurses working with you?</p> <p><input type="checkbox"/> Poor <input type="checkbox"/> Regular <input type="checkbox"/> Good <input type="checkbox"/> Very good <input type="checkbox"/> Excellent</p>	<p>2</p>	<p>1</p>	<p>1</p>	<p>Removed. Item was considered irrelevant to the study's objectives in terms of theory or practice.</p>
<p>6. How sure are you that you can properly...? (Please circle only one number per row)</p> <p>A. Conduct a thorough VTE risk assessment. B. Educate the patient on oral anticoagulants. C. Effectively use mechanical devices for VTE prevention (for example, graduated compression stockings, intermittent pneumatic compression, or plantar pump). D. Educate patients and their families about the signs, symptoms, treatment, and prevention of DVT and pulmonary embolism. E. Explain at-risk patients about lifestyle changes (for example, losing weight, quitting smoking, and having regular exercise). F. Encourage early mobilization and leg exercise.</p> <p>1 Never 2 Rarely 3 Sometimes 4 Most of the time 5 Always</p>	<p>6</p>	<p>2</p>	<p>1</p>	<p>5. How often do you feel sure you can properly do the following procedures?</p> <p>A. Assessing venous thromboembolism risk. B. Educating patients on oral anticoagulants. C. Effectively using mechanical devices for VTE prevention (for example, graduated compression stockings, intermittent pneumatic compression, or plantar pump). D. Educating patients and their families on the signs, symptoms, treatment, and prevention of DVT and pulmonary embolism. E. Explaining at-risk patients about lifestyle changes (for example, losing weight, quitting smoking, and having regular exercise). F. Encouraging early mobilization. G. Encouraging leg exercise.</p> <p>1 Never 2 Rarely 3 Sometimes 4 Most of the time 5 Always</p>
<p>7. What are the risk factors for VTE?</p> <p><input type="checkbox"/> Age (>40); <input type="checkbox"/> Cancer; <input type="checkbox"/> Inflammatory bowel disease; <input type="checkbox"/> Thrombophilia; <input type="checkbox"/> Smoking history; <input type="checkbox"/> Obesity; <input type="checkbox"/> VTE history; <input type="checkbox"/> VTE family history; <input type="checkbox"/> Pregnancy/postpartum period; <input type="checkbox"/> Diabetes mellitus; <input type="checkbox"/> Heart and respiratory failure; <input type="checkbox"/> Nephrotic syndrome; <input type="checkbox"/> Trauma (upper or lower extremities); <input type="checkbox"/> Lack of mobility; <input type="checkbox"/> Central venous catheterisation/pacemaker; <input type="checkbox"/> Surgery; <input type="checkbox"/> Hormone replacement therapy; <input type="checkbox"/> Chemotherapy/radiation therapy; <input type="checkbox"/> Oral contraception containing estrogen; <input type="checkbox"/> Paralysis; <input type="checkbox"/> Paroxysmal nocturnal haemoglobinuria; <input type="checkbox"/> Hospitalization; <input type="checkbox"/> Acute medical condition (such as pneumonia, sepsis etc.); <input type="checkbox"/> Varices/vein removal; <input type="checkbox"/> Neurological condition presenting with paresis of the extremities;</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>6. What are the risk factors for venous thromboembolism?</p> <p><input type="checkbox"/> Age >40 years <input type="checkbox"/> Cancer <input type="checkbox"/> Inflammatory bowel disease <input type="checkbox"/> Thrombophilia <input type="checkbox"/> Smoking history <input type="checkbox"/> Obesity <input type="checkbox"/> History of venous thromboembolism <input type="checkbox"/> Family history of venous thromboembolism <input type="checkbox"/> Pregnancy/puerperium <input type="checkbox"/> Diabetes mellitus <input type="checkbox"/> Heart and respiratory failure <input type="checkbox"/> Nephrotic syndrome <input type="checkbox"/> Trauma (upper or lower extremities) <input type="checkbox"/> Bedridden patient <input type="checkbox"/> Central venous catheterization/pacemaker <input type="checkbox"/> Postoperative period <input type="checkbox"/> Hormone replacement therapy <input type="checkbox"/> Chemotherapy/radiation therapy <input type="checkbox"/> Oral contraception containing estrogen <input type="checkbox"/> Restricted ambulation <input type="checkbox"/> Paroxysmal nocturnal haemoglobinuria <input type="checkbox"/> Hospitalization <input type="checkbox"/> Acute medical disease (such as pneumonia, sepsis etc.) <input type="checkbox"/> Varicose veins of the lower extremities <input type="checkbox"/> Neurological condition presenting with paresis of the extremities</p>

Continue...

Continuation.

<p>8. What are the signs and symptoms of deep vein thrombosis (DVT)? Please check all that apply.</p> <p><input type="checkbox"/> Pain or changes in calf sensitivities</p> <p><input type="checkbox"/> Swelling in the groin</p> <p><input type="checkbox"/> Distended superficial veins</p> <p><input type="checkbox"/> Swelling</p> <p><input type="checkbox"/> Erythema and discoloration</p> <p><input type="checkbox"/> Cyanosis</p> <p><input type="checkbox"/> Localized heat</p> <p><input type="checkbox"/> Pitting edema</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>7. What are the signs and symptoms of deep vein thrombosis? Please check all that apply.</p> <p><input type="checkbox"/> Pain or changes in calf sensitivities</p> <p><input type="checkbox"/> Inguinal edema</p> <p><input type="checkbox"/> Distended superficial veins</p> <p><input type="checkbox"/> Anasarca</p> <p><input type="checkbox"/> Erythema and discoloration</p> <p><input type="checkbox"/> Cyanosis</p> <p><input type="checkbox"/> Localized heat stroke</p> <p><input type="checkbox"/> Pitting edema</p> <p><input type="checkbox"/> Burning sensation of the lower extremities</p>
<p>9. What are the signs and symptoms of pulmonary embolism? Please check all that apply.</p> <p><input type="checkbox"/> Tachypnoea (>20/minute)</p> <p><input type="checkbox"/> Cyanosis</p> <p><input type="checkbox"/> Pleural or chest pain</p> <p><input type="checkbox"/> Tachycardia (>100 BPM)</p> <p><input type="checkbox"/> Hemoptysis</p> <p><input type="checkbox"/> Sudden collapse</p> <p><input type="checkbox"/> Shortness of breath</p> <p><input type="checkbox"/> Cough</p> <p><input type="checkbox"/> Sweating</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>8. What are the signs and symptoms of pulmonary embolism? Please check all that apply.</p> <p><input type="checkbox"/> Tachypnea (>20 breaths per minute)</p> <p><input type="checkbox"/> Cyanosis</p> <p><input type="checkbox"/> Pleural or chest pain</p> <p><input type="checkbox"/> Tachycardia (>100 BPM)</p> <p><input type="checkbox"/> Hemoptysis</p> <p><input type="checkbox"/> Syncope</p> <p><input type="checkbox"/> Shortness of breath</p> <p><input type="checkbox"/> Cough</p> <p><input type="checkbox"/> Sweating</p>
<p>10. Nearly all hospitalized patients are at risk for VTE.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>0</p>	<p>0</p>	<p>0</p>	<p>9. Nearly all hospitalized patients are at risk for venous thromboembolism.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>11. Mechanical prophylaxis is as effective as pharmacologic prophylaxis in preventing VTE.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>1</p>	<p>0</p>	<p>0</p>	<p>10. Mechanical prophylaxis is as effective as pharmacologic prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>12. A history of heparin-induced thrombocytopenia is a contraindication to VTE pharmacological prophylaxis heparin or low molecular weight heparin (for example, enoxaparin).</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>3</p>	<p>0</p>	<p>0</p>	<p>11. A history of heparin-induced thrombocytopenia may be a contraindication to VTE pharmacologic prophylaxis with unfractionated heparin or low molecular weight heparin (for example, enoxaparin).</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>13. Recent surgery is a contraindication to VTE pharmacologic heparin or low molecular weight heparin prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>12. Recent surgery is a contraindication to pharmacologic unfractionated heparin or low molecular weight heparin prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>14. Central nervous system surgery within 24 hours is an absolute contraindication to heparin prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>13. Central nervous system surgery over the previous 24 hours an absolute contraindication to heparin prophylaxis</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>15. Platelet count <100,000 is an absolute contraindication to heparin prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>0</p>	<p>0</p>	<p>0</p>	<p>14. Platelet count <100.000 is an absolute contraindication to heparin prophylaxis.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>16. Is a 35-year-old patient without a significant previous history hospitalized after inguinal hernia correction at risk for VTE?</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>4</p>	<p>0</p>	<p>0</p>	<p>15. Is a 35-year-old patient without previous history hospitalized after inguinal hernia correction at risk for venous thromboembolism?</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>17. Aspirin is an acceptable alternative to heparin for pharmacologic prophylaxis</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>0</p>	<p>0</p>	<p>0</p>	<p>16. Aspirin is acceptable as an alternative to heparin for pharmacologic prophylaxis</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>18. Enoxaparin as compared to heparin offers significant advantages for VTE prophylaxis, as enoxaparin is associated with a lower incidence of heparin-induced thrombocytopenia.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>3</p>	<p>0</p>	<p>0</p>	<p>17. Enoxaparin is associated with a lower incidence of thrombocytopenia as compared to unfractionated heparin.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>
<p>19. Warfarin (oral anticoagulant) interacts with many other drugs, such as aspirin or ibuprofen.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>	<p>2</p>	<p>0</p>	<p>0</p>	<p>18. Warfarin (oral anticoagulant) interacts with many other drugs, such as aspirin or ibuprofen.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p>

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Continuation.

<p>20. Beverages low on vitamin K do not impact warfarin. These include: herbal and black tea (green tea is an exception), coffee, and cola beverages (for example, Coke). <input type="checkbox"/> True <input type="checkbox"/> False</p>	3	0	0	<p>19. Beverages with low levels of do not impact warfarin action. These include: herbal and black tea (green tea is an exception), coffee, and cola beverages (for example, Coke). <input type="checkbox"/> True <input type="checkbox"/> False</p>
<p>21. Which of the following is the initial diagnostic test of choice for VTE? (Please choose only one.) <input type="checkbox"/> Venography <input type="checkbox"/> Computed tomography <input type="checkbox"/> D-dimer <input type="checkbox"/> Impedance plethysmography <input type="checkbox"/> Duplex scan (lower extremities USS)</p>	3	1	0	<p>20. Which of the following tests is indicated for the initial diagnosis of deep vein thrombosis? Please choose only one. <input type="checkbox"/> Venography <input type="checkbox"/> Computed tomography <input type="checkbox"/> D-dimer <input type="checkbox"/> Impedance plethysmography <input type="checkbox"/> Venous Doppler of the lower extremities</p>
<p>22. Which of the following is the initial diagnostic test of choice for pulmonary embolism? Please choose only one. <input type="checkbox"/> Duplex scan (lower extremities USS) <input type="checkbox"/> V/Q scan (lung scan) <input type="checkbox"/> D-dimer <input type="checkbox"/> Computed tomography <input type="checkbox"/> Pulmonary angiography</p>	4	1	0	<p>21. Which of the following tests is considered the gold standard in pulmonary embolism diagnosis, considering high risk patients? Please choose only one. <input type="checkbox"/> Venous Doppler of the lower extremities <input type="checkbox"/> Pulmonary perfusion scintigraphy <input type="checkbox"/> D-dimer <input type="checkbox"/> Computed tomography <input type="checkbox"/> Pulmonary angiography</p>