

## Risk factors for the development of phlebitis: an integrative review of literature



*Fatores de risco para o desenvolvimento da flebite: revisão integrativa da literatura*  
*Los factores de riesgo para el desarrollo de flebitis: revisión integrativa de la literatura*

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### How to cite this article:

Urbanetto JS, Freitas APC, Oliveira APR, Santos JCR, Muniz FOM, Silva RM, et al. Risk factors for the development of phlebitis: an integrative review of literature. Rev Gaúcha Enferm. 2017;38(4):e57489. doi: <http://dx.doi.org/10.1590/1983-1447.2017.04.57489>.

DOI: <http://dx.doi.org/10.1590/1983-1447.2017.04.57489>

### ABSTRACT

**Objective:** To describe the scientific evidences published in literature regarding the risk factors for the development of phlebitis.

**Method:** Integrative review of literature with the inclusion of 14 original articles found in the LILACS, Scielo and Pubmed bases from January 2004 to April 2015, analyzed by level of evidence and frequency, associated factors, degree and treatment of phlebitis.

**Results:** The minimum frequency/incidence/ rate of phlebitis was 3% and the maximum was 59.1%. Most articles (57.14%) associated phlebitis with risk factors, including dwell time, puncture site and/or anatomical area, hospitalization period, number of accesses, reason for removal, sex, antibiotics, intermittent maintenance and emergency insertion.

**Conclusions:** The need for standardizing the quantification of this event and a weak connection between the risk factors associated with phlebitis were identified. Further studies need to be developed in order to grant an actual understanding of this problem in a hospital daily routine.

**Keywords:** Phlebitis. Peripheral catheterization. Nursing care. Intravenous infusions. Review.

### RESUMO

**Objetivo:** Descrever as evidências científicas publicadas na literatura acerca dos fatores de risco para o desenvolvimento das flebites.

**Método:** Revisão integrativa da literatura com inclusão de 14 artigos originais encontrados nas bases LILACS, Scielo e Pubmed de janeiro de 2004 a abril de 2015, analisados quanto ao nível de evidência e frequência, fatores associados, grau e tratamento das flebites.

**Resultados:** A frequência/incidência/taxa mínima de flebite foi de 3% e a máxima foi de 59,1%. A maioria dos artigos (57,14%) associou a flebite com fatores de risco, entre eles, o tempo de permanência, local de punção e/ou região anatômica, tempo de internação, quantidade de acessos, motivo de retirada, sexo, antibióticos, manutenção intermitente e inserção de emergência.

**Conclusões:** Identificou-se a necessidade de uniformização da quantificação deste evento e uma baixa consonância entre os fatores de risco associados a flebites. Outros estudos precisam ser desenvolvidos para o real entendimento deste agravo no cotidiano hospitalar.

**Palavras-chave:** Flebite. Cateterismo periférico. Cuidados de enfermagem. Infusões intravenosas. Revisão.

### RESUMEN

**Objetivo:** Describir las evidencias científicas publicadas en la literatura sobre los factores de riesgo para el desenvolvimiento de las flebitis.

**Método:** Revisión integradora de la literatura con la inclusión de 14 artículos originales encontrados en LILACS, SciELO y PubMed desde enero de 2004 hasta abril de 2015, analizados con respecto al nivel de evidencia y la frecuencia, factores asociados, el grado y el tratamiento de flebitis.

**Resultados:** La frecuencia/incidencia/ tasa mínima de flebitis fue del 3% y el máximo fue de 59,1%. La mayoría de los artículos (57,14%) reportaron asociación de la flebitis con los factores de riesgo, entre ellos se tiene: el tiempo de permanencia, sitio de la punción y/o región anatómica, tiempo de internación, número de accesos, motivo de retiro, sexo, antibióticos, mantenimiento intermitente e inserción de emergencia.

**Conclusiones:** Se identificó la necesidad de estandarizar la cuantificación del evento y una baja concordancia entre los factores de riesgo asociados con la flebitis. Otros estudios necesitan ser desarrollados para el real entendimiento de esta queja en la rutina hospitalaria.

**Palabras clave:** Flebitis. Cateterismo periférico. Atención de enfermería. Infusiones intravenosas. Revisión.

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## INTRODUCTION

Intravenous therapy is a technical-scientific process eminently executed by the nursing staff in hospitals. The peripheral access is performed by inserting a catheter in a peripheral vein, mainly in the dorsal venous network of the hands and forearm.

Phlebitis is the inflammation of a vein, and is a common complication associated with the use of peripheral intravenous catheters<sup>(1-2)</sup>. Some aspects are described as risk factors for the onset of phlebitis, such as: the catheter dwell time, puncture site, hospitalization period, use of antibiotics, emergency intervention, sex and number of punctures per patient<sup>(3-6)</sup>.

The phlebitis is classified in four degrees, according to the clinical signs presented by the patient: Degree 1: Reddening (erythema) around the peripheral intravenous catheters (CIP), with or without local pain; Degree 2: Local pain with reddening (erythema) and / or swelling; Degree 3: Local pain with erythema, hardening and palpable venous cord formation; Degree 4: Local pain with erythema, hardening and palpable venous cord formation > 1 inch in length (2,54 cm) with purulent drainage<sup>(7)</sup>. Phlebitis can be classified, according to the causative factors in; mechanical phlebitis, bacterial phlebitis, post-infusion phlebitis and chemical phlebitis<sup>(2,7)</sup>.

Based on the National Patient Safety Program guidelines<sup>(8)</sup>, health care should be carried out with a view to patient safety, reducing the risk of damage to the acceptable minimum. According to Infusion Nurses Society<sup>(7)</sup>, the acceptable phlebitis rate should be 5% or less for a given population. It is necessary, therefore, to hold a critical reflection on the role of nursing in patient care that uses peripheral intravenous devices, considering that phlebitis may be an initial route of complex diseases, such as thrombophlebitis and sepsis, e.g.

In the context described above, studies to seek evidence that will result in directing daily nursing practices to reduce the occurrence of this damage, which is currently described as an important indicator of the quality of care is necessary.

Therefore, this study was guided by the following question: what scientific evidence has been published in literature on the risk factors for the development of phlebitis? To answer this question, the objective was to describe the scientific evidence published in literature about the risk factors for the development of phlebitis.

## METHOD

This paper is an integrative literature review, constructed from six predetermined steps<sup>(9)</sup>: (1) identification of the issue

and guiding question of the study; (2) formulation of inclusion and exclusion criteria; (3) definition of the information that will be removed from the selected literature forming a categorization of studies; (4) evaluation of the articles already included in the integrative review; (5) interpretation and compilation of the identified results and (6) presentation of the synthesis of the acquired knowledge.

The defined theme was phlebitis, and the guiding question was "what scientific evidence has been published in literature on the risk factors for the development of phlebitis?" The search for articles was held in databases *SciELO*, *Pubmed* and LILACS, in English, Portuguese and Spanish. With support in the study's guiding question, keywords phlebitis, phlebitis, flebitis, peripheral catheterization, peripheral catheter and peripheral venous catheter. Inclusion criteria were: original articles available in full online, with a publication year between 2004 and April 2015, in Portuguese, English and Spanish, and performed with adult subjects with a peripheral intravenous catheter. Integrative or systematic review articles, monographs, dissertations or theses were excluded. Chart 1 presents the search results according to the descriptor and total of articles inserted in the study, after the application of the selection criteria for said articles. Some articles found in the LILACS database, were also found in the SciELO database, and were therefore only analyzed once.

To select the articles, the title and abstract of the article was first analyzed to ensure that it contemplated the purpose of the study and the criteria for inclusion and exclusion established. After identifying the relevant articles, a thorough exploratory reading of the articles in full, highlighting the important points found was carried out, building, in this way, a pre-analysis and synthesis of relevant data items based on a data collection instrument with pre-established questions: periodic, year of publication, authors, article title, outline, level of evidence, subjects involved, results and conclusions found.

For the classification of evidence level of the studies found, the classification proposed by Melnyk and Fineout-Overholt<sup>(10)</sup> was used: Strong (level 1, the evidence are from systematic review or meta-analysis of all relevant randomized controlled clinical trials or arising out of clinical guidelines based on systematic reviews of randomized controlled clinical trials, level 2 evidence derived from at least one randomized well-outlined controlled trial); Moderate (level 3, evidence from well-designed clinical trials without randomization; level 4, evidence from cohort studies and well-designed case-control); non-randomized clinical trial case-control or cohort) and Poor (level 5 evidence originating from systematic review of descriptive and qualitative studies; level 6, evidence derived from a single descriptive

or quantitative study; Level 7, evidence from authorities of opinion and / or expert committee reports).

Subsequently, the relevant data were categorized and grouped into instruments named summary charts, built for the purpose of compiling relevant information such as authors, title, year and periodic where the article was published (Chart 2); outline; subjects involved and main findings (Chart 3). The purpose of these instruments was to aggregate the knowledge produced on the subject explored in this study. The authorship and reliability of the data contained in the articles included in this integrative review were guaranteed, and this article is linked to the research project approved by the institution's CEP under protocol Nº 1082/07.

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DESCRIPTOR	LILACS	SCIELO	PUBMED
Phlebitis	45 articles	21 articles	
Phlebitis		47 articles	
Flebitis.		42 articles	
Peripheral Venous Catheter	87 articles	21 articles	
Peripheral catheter		27 articles	
Peripheral catheterization		2 articles	
Peripheral catheter + Phlebitis		3 articles	
Phlebitis + Peripheral Venous Catheter	9 articles		
<i>Phlebitis + peripheral catheterization related to adverse effects</i>			125 articles
<b>Total articles found</b>	<b>141</b>	<b>163</b>	<b>125</b>
<b>Total excluded articles for failing to meet criteria or duplication</b>	<b>140</b>	<b>160</b>	<b>115</b>
<b>Total articles inserted in the sample</b>	<b>01</b>	<b>3</b>	<b>10</b>

**Chart 1** - List of search results on said data banks. Porto Alegre, April/2015

Source: Survey data, 2015.

## RESULTS

In the research carried out in such databases, 429 articles were found, where only 14 (3%) articles were selected for the integrative review, in accordance with the inclusion criteria previously established.

In the LILACS database, 141 articles were located and only one (7%) was selected. In SCIELO database, 163 articles were found and only three (21%) were included. In PUBMED database, a total of 125 articles were found and only 10 (71%) articles were selected.

The countries of origin of the studies were Brazil, with five articles (36%), Australia with three articles (21%) and the United States, China, Spain, Nepal, the UK and Italy, with one article each. Magazines Acta Paulista de Enfermagem e Texto and Contexto Enfermagem presented two publications each. The others presented only one publication each. An increase of publications on the subject can be seen in recent years, especially in 2012, with five articles (36%), and 2014 with three articles (21%). Chart 2 presents the items included, according to the year, published periodical and main goal.

No.	Authors	Article	Year / Periodical
1	Pasalioglu KB, Kaya H <sup>(3)</sup>	Catheter indwell time and phlebitis development during peripheral intravenous catheter administration	2014 - Pak J Med Sci EUA
2	Abdul-Hak CK, Barros AF <sup>(4)</sup>	The incidence of phlebitis in a medical clinical unit	2014 -Texto Contexto Enferm - Brasil
3	Tertuliano AC, Borges JLS, Fortunato RAS, Oliveira AL, Poveda VB <sup>(11)</sup>	Phlebitis associated with peripheral intravenous catheter among in-patients of a hospital in vale do paraíba	2014 Rev. Min. Enferm. Brasil

4	Rickard CM, Webster J, Wallins ML, Marsh N, McGrail MR, French V, Foster L, Gallager P, Gowardman JR, Zhang L, McClymont A, Whitby M <sup>(12)</sup>	Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial	2012 - The Lancet Austrália
5	F Liu, D Chen, Y Liao, L Diao, Y Liu, M Wu, X Xue, C You, Y Kang <sup>(13)</sup>	Effect of Intrafix SafeSet infusion apparatus on phlebitis in a neurological intensive care unit: A case control study	2012 The Journal of International Medical Research China
6	Viana TS, Crespo FN, Merino GM, Ruiz JMG, Lorenzo IL, Fuentes <sup>(14)</sup>	Impacto de la implantación de recordatorios para disminuir eventos adversos en pacientes con accesos venosos periféricos	2012 Na. Sist. Sanit. Navar Espanha
7	Rodrigues CC, Guilherme C, Júnior MLC, Carvalho EC <sup>(15)</sup>	Fatores de risco para trauma vascular durante a quimioterapia antineoplásica: contribuições do emprego do risco relativo	2012 Acta Paul Enferm. Brasil
8	Bertolino G, Pitassi A, Tinelli C, Stanicia A, Guglielmana B, Scudeller L, Balduini C <sup>(16)</sup>	Intermittent flushing with heparin versus saline for maintenance of peripheral intravenous catheters in a medical department: a programatic cluster-randomized controlled study	2012 Worldviews on evidence – Based Nursing Itália
9	Magerote NP, Lima MHM, Silva JB, Correia MDL, Secoli SR <sup>(5)</sup>	Relation between phlebitis and peripheral intravenous catheter removal	2011 Texto Contexto Enferm Brasil
10	Rickard CM, McCann D, Munnings J, McGrail MR <sup>(17)</sup>	Routine resite of peripheral intravenous devices every 3 days did not reduce complications compared with clinically indicated resite: a randomised controlled trial	2010 BMC Medicine Austrália
11	Donk PV, Rickard CM, McGrail MR, Doolan G <sup>(6)</sup>	Routine Replacement versus Clinical Monitoring of Peripheral Intravenous Catheters in a Regional Hospital in the Home Program: A Randomized Controlled Trial	2009 Infection Control and Hospital Epidemiology Reino Unido
12	Webster J, Clarke S, Paterson D, Hutton A, Dyk SV, Gale C, Hopkins T <sup>(18)</sup>	Routine care of peripheral intravenous catheters versus clinically indicated replacement: randomized controlled trial	2008 BMJ Austrália
13	Singh R, Bhandary S, Pun KD <sup>(19)</sup>	Peripheral intravenous catheter related phlebitis and its contributing factors among adult population at KU Teaching Hospital	2008 Kathmandu University Medical Journal Nepal
14	Ferreira LR, Pereira MLG, Diccini S <sup>(20)</sup>	Phlebitis among neurosurgical patients	2007 Acta Paul Enferm Brasil

**Chart 2** - Synoptic chart with Articles included by authors, title, year and published journal. Porto Alegre, 2015. n =14 articles

Source: Authors.

For the presentation of the relevant findings from the 14 articles, Chart 3 shows the outline of the study, subjects involved and/or number of the CIP evaluated, level of evi-

dence and main findings. In the main findings, a predetermined search in four categories was performed: (1) frequency / incidence / phlebitis rate, however, one of the articles

presented terminology (percentage) to demonstrate its phlebitis results; (2) variables associated with phlebitis, (3) degree of phlebitis and (4) treatment interventions.

In regards to the first category, 21.4% of the articles had phlebitis often; 50% as incidence, 21.4% as a rate and 7.1% as percentage. As for the second category, variables associated with phlebitis, 57.1% reported some type of risk factors associated with phlebitis, with them being the dwell time (four articles); puncture site and or anatomical region (two articles); hospitalization period; number of accesses; normal use of the infusion apparatus; reason for removal;

sex; antibiotics; intermittent maintenance; emergency medical insertion (one article each) and 42.9% do not describe variables associated with phlebitis. The third category, degree of phlebitis, was described in 35.7% of the articles, being grade 1 the most prevalent, with a maximum rate of 46.2%. The fourth category, interventions for the treatment of phlebitis was not described in 92.9% of the articles.

Regarding the level of evidence found in the articles included in this integrative review, 42.8% of the articles were classified as strong evidence - level 2; 28.6% as moderate evidence - level 4; and 28.6% as poor evidence - level 6 (Chart 3).

No.	Outlining Subjects involved Evidence Level	Main findings
1	Cross-sectional study. Subjects: 103 individuals - 439 CIPs <sup>(3)</sup> <b>Evidence Level:</b> Poor - Level 6	<b>Frequency of phlebitis:</b> 41.2%. <b>Variables associated with phlebitis:</b> permanence of the catheter <48 hours was 5.8 times higher than in patients with catheters left for 97-120 hours (p = 0.000). Use of antibiotics (p = 0.002) and puncture site (p = 0.034). <b>Phlebitis Degree:</b> 90.1% developed the 1st signs of phlebitis. <b>Treatment Interventions:</b> Not described.
2	Prospective cohort study. Subjects: 100 individuals - 234 CIPs <sup>(4)</sup> <b>Evidence Level:</b> Poor - Level 4	<b>Phlebitis incidence:</b> 55.6% <b>Variables associated with phlebitis:</b> hospitalization period up to 18 days (p = 0.002), higher amount of accesses per patient (p <0.001) and the catheter dwell time > 72 h (p <0.001). <b>Phlebitis Degree:</b> degree 1 (46.2%), degree 2 (40%), degree 3 (18.3%). <b>Treatment Interventions:</b> Not described.
3	Prospective, quantitative, descriptive-exploratory type. Subjects: 76 patients <sup>(11)</sup> <b>Evidence Level:</b> Poor - Level 6	<b>Phlebitis percentage:</b> 31.6%. <b>Variables associated with phlebitis:</b> Not described. Descriptive study. <b>Phlebitis degree:</b> 41.6% - Degree 1 (37.5%), Degree 2 (16.7%), Degree 3 (4.2%). <b>Treatment Interventions:</b> Not described.
4	Multicenter Study, non-blind, controlled and randomized. Subjects: 1593 medically indicated. 1690 routine replacement/5907 CIP <sup>(12)</sup> <b>Evidence Level:</b> Poor - Level 2	<b>Phlebitis incidence:</b> Per patient: 7% - Medically indicated and 7% in routine replacements. Per Catheter 13.08 in medically indicated group and 13.11% in the routine replacement group (3 days). <b>Variables associated with phlebitis:</b> no association was found between the two groups with Phlebitis (p = 0.64 and p = 0.67) <b>Phlebitis Degree:</b> Not described. <b>Treatment Interventions:</b> Not described.
5	Case control Subjects: 836 patients - control group (Standard infusion apparatus) and 709 patients - Study group (Intrafix® SafeSet infusion devices) <sup>(13)</sup> <b>Evidence Level:</b> Moderate - Level 4	<b>Phlebitis incidence:</b> 17.9% in the group using Intrafix® SafeSet and 23.4% in the group that did not. <b>Variables associated with phlebitis:</b> Use of the standard infusion apparatus (p = 0.008). <b>Phlebitis degree:</b> Not described. <b>Treatment Interventions:</b> Degree 1 and 2 - compresses with magnesium sulfate at 50%; Degree 2 and 3 - away from ulceration, external application of traditional Chinese formula; Degrees 1 to 4 - transparent hydrocolloid plate, according to each reaction.

6	<p>Quasi-experimental study. Subjects: 2009 period - 9263 patients and in 2010 - 9220 patients<sup>(14)</sup> <b>Evidence Level:</b> Poor - Level 2</p>	<p><b>Phlebitis incidence:</b> Pre intervention (2009) - 10.87%; Post Intervention (2010) - 8.99%. <b>Associated variables:</b> Not described. <b>Phlebitis degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>
7	<p>Observational quantitative study. Subjects: 30 women<sup>(15)</sup> <b>Evidence Level:</b> Poor - Level 6</p>	<p><b>Frequency of phlebitis:</b> Not described separately. Between phlebitis and infiltration, 13 situations were described (43.47%). <b>Variables associated with phlebitis:</b> Not described. <b>Phlebitis Degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>
8	<p>Randomized controlled study Subjects: 107 in the Heparin use/285 CIP 285 and 107 group in the Saline solution/363 CIP<sup>(16)</sup> group. <b>Evidence Level:</b> Poor - Level 2</p>	<p><b>Frequency of phlebitis:</b> 12.6% of the group receiving heparin and 24.2% of the group receiving saline. Not proving a difference between the chances of phlebitis among both types (OR 0.45 CI .28-.71) <b>Variables associated with phlebitis:</b> Not described. <b>Phlebitis degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>
9	<p>Prospective cohort study. Subjects: 76 patients/155 catheters<sup>(5)</sup> <b>Evidence Level:</b> Moderate - Level 4</p>	<p><b>Phlebitis incidence:</b> 25.8%. <b>Variables associated with phlebitis:</b> Anatomical region of the puncture in the forearm, wrist and hand (<math>p = 0.056</math>) and reason for removal by adverse event (<math>p &lt; 0.001</math>). <b>Phlebitis degree:</b> Degree 1 - 32.5%, Degree 2 - 40.0%, Degree 3 - 2.5% and Degree 4 - 25%. <b>Treatment Interventions:</b> Not described.</p>
10	<p>Randomized controlled study Subjects: 185 patients CIP replacement group through medical recommendation and 177 through replacement routine (3 days)/603 CIP<sup>(17)</sup> <b>Evidence Level:</b> Poor - Level 2</p>	<p><b>Phlebitis rate:</b> 7% in the routine removal group and 10% in group medically recommended removal There is increasing evidence that routine IVD exchange may be ineffective, although care has been requested in light of the large number (74%) in both groups in most studies to date. <b>Variables associated with phlebitis:</b> there was no statistical difference in the occurrence of phlebitis in either group (<math>p = 0.34</math>), which creates doubt about the recommendation of the time of routine maintenance of the CIP. <b>Phlebitis degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>
11	<p>Randomized controlled study. Subjects: 316 patients<sup>(6)</sup> <b>Evidence Level:</b> Poor - Level 2</p>	<p><b>Phlebitis rate:</b> Not described separately. Between phlebitis and occlusion that have been described together, there were 61 events between case patients and 39 events in individual control. 87.3%. <b>Variables associated with phlebitis:</b> Females (<math>p = 0.003</math>) and Insertion by emergency physicians (<math>p = 0.024</math>). There was no statistical difference in the occurrence of phlebitis in either group (23.4%), which creates doubts about the recommendation of the time of routine maintenance of the CIP. <b>Phlebitis degree:</b> Most phlebitis was associated with pain, redness or swelling <b>Treatment Interventions:</b> Not described.</p>
12	<p>Randomized controlled study. Subjects: 379 patients CIP replacement group through medical recommendation and 376 through routine replacement/603 CIP<sup>(18)</sup> <b>Evidence Level:</b> Poor - Level 2</p>	<p><b>Phlebitis rate:</b> 4% in the CIP replacement group on medical recommendation and 3% in the routine replacement group. <b>Variables associated with phlebitis:</b> no average dwell time association with phlebitis was found - RR 1.32 (0.63 to 2.76). <b>Phlebitis Degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>

<p><b>13</b></p>	<p>Observational, prospective study. Subjects: 230 patients<sup>(19)</sup> <b>Evidence Level:</b> Poor Level 6</p>	<p><b>Phlebitis incidence:</b> 59.1%. <b>Variables associated with phlebitis:</b> age 21-30 years (OR 4.13 CI 1.43 - 11.47) and 31-40 years (OR 1,4 CI 3.06 - 9.00) (p &lt;0.05); IV medication use (OR 1.81 CI 1.03 to 3.15); dwell time equal to or greater than 71.8 hours (p &lt;0.05). <b>Phlebitis degree:</b> 40% developed a moderate degree. <b>Treatment Interventions:</b> Not described.</p>
<p><b>14</b></p>	<p>Prospective cohort study Subjects: 60 patients/152 CIP<sup>(20)</sup> <b>Evidence Level:</b> Moderate - Level 4</p>	<p><b>Phlebitis incidence:</b> 10.5% <b>Variables associated with phlebitis:</b> dwell time ≥ 72 hours (p = 0.0006); intermittent maintenance of peripheral intravenous catheters (p = 0.002). <b>Phlebitis Degree:</b> Not described. <b>Treatment Interventions:</b> Not described.</p>

**Chart 3** - Synoptic chart - outline, subjects involved and main findings included in the articles. Porto Alegre, 2015. n =14 articles

Source: Authors.

## ■ DISCUSSION

Based on the analysis of 14 articles included in this integrative review on the theme phlebitis, it can be seen that the volume of publications on the subject is not sufficient to meet the needs, considering the importance of this indicator in the quality of care. The frequency / incidence / minimum rate of phlebitis was 3%<sup>(17)</sup> and the maximum was 59.1%<sup>(18)</sup>. The results of this review showed an extremely comprehensive range between the findings and well beyond the up to 5% recommended by the Infusion Nurses Society<sup>(7)</sup>.

Another complicating aspect to understanding this event is that the data are often not explicit or are grouped with other events, such as phlebitis and infiltration of the CIP, with frequency of 43.5%<sup>(14)</sup> or phlebitis and CIP occlusion, with a rate of 87.3%<sup>(6)</sup>.

One aspect that deserves special attention is the study of the dwell time variable of the CIP. Of the 14 articles included, eight<sup>(3,4,6,11,16-19)</sup> were developed in order to study the association of this variable with the presence of phlebitis and / or compare the scheduled removal of up to 72 hours (three days) or the removal according to a medical evaluation of the CIP insertion point were related to phlebitis.

Among these studies, only three described an association between phlebitis and variable dwell time ≥ 72 hours, resulting in higher risks for the development of phlebitis<sup>(4,18-19)</sup>; one found an association of phlebitis with the catheter dwell time <48 hours<sup>(3)</sup> and, the four<sup>(6,11,16-17)</sup> that compared the routine removal with the medically recommended removal found no association of these variables with the occurrence of phlebitis.

Although there is a recommendation to replace peripheral catheters every 72-96 hours to reduce the risk of infection and phlebitis in adults<sup>(19-20)</sup>, the replacement of peripheral catheters in adults only when medically recommended needs further study<sup>(20)</sup>. In children, the appointment of the CIP exchange is consolidated in cases where it is medically recommended and not routine<sup>(21-22)</sup>. In Brazil, in situations where the peripheral access is limited, the decision to keep the catheter beyond 72-96 hours depends on skin integrity, duration and type of prescribed therapy and should be documented in the patient records<sup>(21)</sup>.

Thus, a reflection on the real benefits in routine exchange is needed, as are studies to prove the effectiveness of CIP exchange, considering the risks and losses of intravenous therapy. It is known that this can cause discomfort, acute pain, anxiety caused by the need for new peripheral venous punctures that compromise the well-being of patients during hospitalization.

Although the concept of phlebitis not be new, its assessment is still in consolidation. The research of the degrees of phlebitis was seen in only 42.86% of the articles. Three studies used phlebitis analysis according to the Infusion Nurses Society and showed degree 1 as prevalent in two articles (41.6%)<sup>(11)</sup> and (46.2%)<sup>(4)</sup> and third degree in 2 (40%)<sup>(5)</sup>.

Another article classifies the degree as the Visual Infusion Phlebitis Assessment Scale (VIPAS)<sup>(3)</sup> and yet another form of phlebitis rating was through points: when presenting two points of a scale of 10, it is considered phlebitis. Symptoms of pain are considered 1 point; redness less than 1 cm, 1 point, and above 2 cm, 2 points; edema, redness and exudate drainage, 1 point; and serosanguinous exudate that needs dressing change, 2 points<sup>(6)</sup>.

As a limitation found in this review, is the lack of information / data on the treatment of phlebitis, since only one article<sup>(12)</sup> mentions intervention for the treatment of phlebitis, despite the importance of the subject. Another critical point was the lack of a follow-up accounts of post-infusion phlebitis, a factor that also contributes to the uniqueness of some important results, especially for the incidence or frequency of phlebitis.

## CONCLUSIONS

This integrative review reached the objective of describing the scientific evidences published in the literature about the development of phlebitis. However, it was found that the phlebitis arising from the CIP insertion still requires studies with strong evidence level (level 1 or 2) to deepen the investigations into the etiology and associated factors. It is necessary to carry out studies that make comparisons between safe and effective interventions when phlebitis is detected in patients, to guide the assistance provided by the professionals, because the lack of the adoption of scales to identify the degrees and treatments of phlebitis makes it difficult for the teams to make decisions regarding the best practices.

The publications that addressed phlebitis show a worrying result, given the disparity of research in this regard. There is a diversity in the way the occurrence of phlebitis is measured which signals the need for an alignment of researchers in this area, as well as follow-up surveys after catheter removal seeking to identify post-infusion phlebitis.

The results about the risk factors associated with phlebitis are still controversial in the literature, which complicates decision making for the teams regarding best practices for the prevention of this disease. However, most studies have pointed to the need for further research about the catheter dwell time, since this variable differs among the analyzed items.

The nursing staff has a key role in prevention, early identification, classification and treatment of this disease. As a result, it is suggested that further research with outlines of randomized controlled clinical trials can be conducted in Brazil that subsequently promote meta-analysis type studies, which provide maximum evidence about phlebitis related to CIP for subsidize clinical guidelines and quality indicators of health care.

## REFERENCES

1. Macklin D. Phlebitis: a painful complication of peripheral IV catheterisation that may be prevented. *Am J Nurs*. 2003;103(2):55-60.

2. Royal College of Nursing (UK). Standards for infusion therapy: the RCN IV Therapy Forum [Internet]. 3rd ed. 2010 [cited 2014 oct 08]. Available from: <http://www.bb Braun.it/documents/RCN-Guidelines-for-IV-therapy.pdf>.

3. Pasalioglu KB, Kaya H. Catheter indwell time and phlebitis development during peripheral intravenous catheter administration. *Pak J Med Sci* [Internet]. 2014 [cited 2014 oct 04];30(4):725-30. Available from: <http://pjms.com.pk/index.php/pjms/article/view/5067>.

4. Abdul-Hak CK, Barros AF. Incidência de flebite em uma unidade de clínica médica. *Texto Contexto Enferm*. [Internet]. 2014 [cited 2014 oct 04];23(3):633-8. Available from: [http://www.scielo.br/scielo.php?pid=S010407072014000300633&script=sci\\_abstract&tlng=t](http://www.scielo.br/scielo.php?pid=S010407072014000300633&script=sci_abstract&tlng=t).

5. Magerote NP, Lima MHM, Silva JB, Correia MDL, Secoli SR. Associação entre flebite e retirada de cateteres intravenosos periféricos. *Texto Contexto Enferm* [Internet]. 2011 [cited 2014 oct 4];20(3): 486-92. doi: 10.1590/S0104-07072011000300009.

6. Donk PV, Rickard CM, McGrail MR, Doolan G. Routine replacement versus clinical monitoring of peripheral intravenous catheters in a regional hospital in the home program: a randomized controlled trial. *Infect Control Hosp Epidemiol* [Internet]. 2009 [cited 2014 oct 04];30(9):915-7. Available from: [http://www98.griffith.edu.au/dspace/bitstream/handle/10072/28824/56857\\_1.pdf?sequence=1](http://www98.griffith.edu.au/dspace/bitstream/handle/10072/28824/56857_1.pdf?sequence=1).

7. Infusion Nurses Society (US). Infusion Nursing Standards of Practice. *J Infus Nurs* [Internet]. 2011 [cited 2014 oct. 08];34(1S):1-110. Available from: <http://engage.ahima.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=2238ee0a-c2df-4d1a-affa-f69f2ce41856>.

8. Ministério da Saúde (BR). Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). *Diário Oficial [da] República Federativa do Brasil*. 2013 abr 2;150(62 Seção 1):43-4.

9. Mendes DS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. *Texto Contexto Enferm* [Internet]. 2008 oct-dez [cited 2014 oct 04];17(4):758-64. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0104-07072008000400018](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072008000400018).

10. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & health-care: a guide to best practice. 3rd ed. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins; 2015.

11. Tertuliano AC, Borges JLS, Fortunato RAS, Oliveira AL, Poveda VB. Flebite em acessos venosos periféricos de pacientes de um hospital do Vale do Paraíba. *REME - Rev Min Enferm* [Internet]. 2014 [cited 2015 mar 11];18(2):334-9. Available from: <http://www.reme.org.br/artigo/detalhes/931>.

12. Rickard CM, Webster J, Wallis MC, Marsh N, McGrail MR, French V, et al. Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial. *Lancet* [Internet]. 2012 [cited 2014 oct 4];380(9847):1066-74. Available from: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(12\)61082-4/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61082-4/abstract).

13. Liu F, Chen D, Liao Y, Diao L, Liu Y, Wu M, et al. Effect of Intrafix® SafeSet infusion apparatus on phlebitis in a neurological intensive care unit: a case-control study. *J Int Med Res*. [Internet]. 2012[cited 2014 oct. 03];40(6):2321-6. Available from: <http://imr.sagepub.com/content/40/6/2321.full.pdf+html>. Erratum in: *J Int Med Res*. 2013 Jun;41(3):914.

14. Viana TS, Crespo FN, Merino GM, Ruiz JMG, Lorenzo IL, Fuentes PS, et al. Impacto de la implantación de recordatorios para disminuir eventos adversos en pacientes con accesos venosos periféricos. *An Sist Sanit Navar* [Internet]. 2012 [cited 2014 oct 4];35(3):395-402. Available from: <http://scielo.isciii.es/pdf/asisna/v35n3/original4.pdf>.

15. Rodrigues CC, Guilherme C, Júnior MLC, Carvalho EC. Fatores de risco para trauma vascular durante a quimioterapia antineoplásica: contribuições do emprego do risco relativo. *Acta Paul Enferm* [Internet]. 2012 [cited 2014 oct 04];25(3):448-52. Available from: <http://dx.doi.org/10.1590/S0103-21002012000300020>.
16. Bertolino G, Pitassi A, Tinelli C, Staniscia A, Guglielmana B, Scudeller L, et al. Intermittent flushing with heparin versus saline for maintenance of peripheral intravenous catheters in a medical department: a pragmatic cluster-randomized controlled study. *Worldviews Evid Based Nurs* [Internet]. 2012 [cited 2014 oct 4];9(4):221-6. Available from: [http://www.researchgate.net/publication/221888238\\_Intermittent\\_Flushing\\_with\\_Heparin\\_Versus\\_Saline\\_for\\_Maintenance\\_of\\_Peripheral\\_Intravenous\\_Catheters\\_in\\_a\\_Medical\\_Department\\_A\\_Pragmatic\\_Cluster-Randomized\\_Controlled\\_Study](http://www.researchgate.net/publication/221888238_Intermittent_Flushing_with_Heparin_Versus_Saline_for_Maintenance_of_Peripheral_Intravenous_Catheters_in_a_Medical_Department_A_Pragmatic_Cluster-Randomized_Controlled_Study).
17. Rickard CM, McCann D, Munnings J, McGrail MR. Routine resite of peripheral intravenous devices every 3 days did not reduce complications compared with clinically indicated resite: a randomised controlled trial. *BMC Med* [Internet]. 2010 [cited 2014 oct 04];8:53. Available from: <http://www.biomedcentral.com/1741-7015/8/53>.
18. Webster J, Clarke S, Paterson D, Hutton A, Dyk SV, Gale C, et al. Routine care of peripheral intravenous catheters versus clinically indicated replacement: randomized controlled trial. *BMJ* [Internet]. 2008 [cited 2014 oct 4];337:a339. Available from: <http://www.bmj.com/content/337/bmj.a339>.
19. Singh R, Bhandary S, Pun KD3. Peripheral intravenous catheter related phlebitis and its contributing factors among adult population at KU Teaching Hospital. *Kathmandu Univ Med J (KUMJ)*. [Internet]. 2008 [cited 2014 oct 4];6(24):443-7. Available from: [http://www.google.com.br/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CC8QFjABahUKewjcn5uL0YvGAhXCsoAKHQb5Alc&url=http%3A%2F%2Fwww.nepjol.info%2Findex.php%2FKUMJ%2Farticle%2Fdownload%2F1732%2F1698&ei=xpZ7VdykIMLggSG8ou4BQ&usq=AFQjCNHQOGmr\\_elv0Ev3LZ8i6FvAfmJjfQ](http://www.google.com.br/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CC8QFjABahUKewjcn5uL0YvGAhXCsoAKHQb5Alc&url=http%3A%2F%2Fwww.nepjol.info%2Findex.php%2FKUMJ%2Farticle%2Fdownload%2F1732%2F1698&ei=xpZ7VdykIMLggSG8ou4BQ&usq=AFQjCNHQOGmr_elv0Ev3LZ8i6FvAfmJjfQ).
20. Ferreira LR, Pereira MLG, Diccini S. Flebite no pré e pós-operatório de pacientes neurocirúrgicos. *Acta Paul Enferm* [Internet]. 2007 [cited 2014 oct 4];20(1):30-6. Available from: <http://www.scielo.br/pdf/ape/v20n1/a06v20n1.pdf>.
21. Agência Nacional de Vigilância Sanitária (BR). Infecção de corrente sanguínea; orientações para prevenção de infecção primária de corrente sanguínea [Internet]. Brasília: ANVISA; 2010 [cited 2014 oct 4]. Available from: <http://portal.anvisa.gov.br/wps/wcm/connect/ef02c3004a04c83ca0fda9aa19e2217c/manual+Final+preven%C3%A7%C3%A3o+de+infec%C3%A7%C3%A3o+da+corrente.pdf?MOD=AJPERES>.
22. Grady NPO, Alexander M, Burns LA, Dellinger P, Galand J, Heard SO, et al. Guidelines the prevention of intravascular catheter related infections, 2011 [Internet]. Atlanta: CDC; 2011 [cited 2014 oct 04]. Available from: <http://www.cdc.gov/hicpac/BSI/BSI-guidelines-2011.html>.

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Received: 08.02.2015

Approved: 01.12.2016