


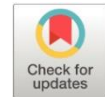


Phlebitis associated with peripheral venous catheter placement: systematic review

Flebitis asociada a la colocación de catéteres venosos periféricos: revisión sistemática

- ¹ Leonor del Rocío Ulloa Heras  <https://orcid.org/0000-0001-9475-5727>
Maestría en Gestión del Cuidado, Posgrado de la Universidad Católica, Ecuador
leitoulloa@hotmail.com
- ² Francly Hollmin Salas Contreras  <https://orcid.org/0000-0003-2207-1953>
Carrera de Enfermería de la Universidad Católica, Ecuador
franholasac@yahoo.es
- ³ María Gabriela Morgado Tapia  <http://orcid.org/0000-0003-0216-3666>
Laboratorio de Psicometría, Psicología Comparada y Etología (LABPPCE)
gmorgado@unab.cl



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Palabras

claves: flebitis, catéter venoso, inflamación, cuidados de enfermería

Keywords:

phlebitis, venous catheter, inflammation, nursing care.

Resumen

El catéter venoso periférico (PVC) a menudo es una aplicación común que utilizamos para el cuidado de pacientes a nivel mundial para la administración de líquido intravenoso (IV). Objetivo: examinar en la literatura científica sobre la flebitis asociada a la colocación de catéter venoso periférico a través de la revisión sistemática. Metodología: es una revisión bibliográfica para la realización de este proceso, se seguirán las recomendaciones del método PRISMA. Resultados principales: la prevalencia a nivel mundial de flebitis fue Australia 12%, Portugal 11,5%, Alemania 7,6%, España 5,6 %, Portugal 36,7%. Los factores de riesgo edad, sitio de venopunción, calibre de catéter venoso, intentos fallidos y medicamentos del VIH, pacientes diabéticos, fármacos inmunosupresores, sitio de venopunción, catlón número 18. Los factores de riesgo de flebitis: edad, sexo, sitio de venopunción, catéteres venosos de gran tamaño, intentos fallidos, líquidos hipertónicos antibióticos. Conclusión: el personal deberá conocer los síntomas de flebitis, monitorear el sitio en el que se colocó la vía venosa periférica, la parte anatómica debe centrarse al calibre del catéter venoso, la atención debe ser cómoda y segura logrando aumentar la calidad de esta, así se lograra evitar complicaciones como por ejemplo inflamación,

Abstract

Peripheral venous catheter (PVC) is often a common application we use for patient care worldwide for intravenous (IV) fluid administration. Objective: to examine the scientific literature on phlebitis associated with peripheral venous catheter placement through systematic review. Methodology: it is a literature review for the realization of this process, the recommendations of the PRISMA method will be followed. Main results: the worldwide prevalence of phlebitis was Australia 12%, Portugal 11.5%, Germany 7.6%, Spain 5.6%, Portugal 36.7%. Risk factors: age, venipuncture site, venous catheter size, failed attempts, and HIV drugs, diabetic patients, immunosuppressive drugs, venipuncture site, cathlon number 18. Risk factors for phlebitis: age, sex, venipuncture site, large venous catheters, failed attempts, hypertonic fluids, antibiotics. Conclusion: the staff should know the symptoms of phlebitis, monitor the site where the peripheral venous line was placed, the anatomical part should focus on the caliber of

the venous catheter, the care should be comfortable and safe, thus increasing the quality of care and avoiding complications such as inflammation,

Introduction

The peripheral venous catheter (PVC) is often a common application that we use for patient care worldwide for the administration of intravenous (IV) fluid and is used for the care of all users who come to different health care facilities for the infusion of intravenous fluid and other clinical interventions (1).

The important thing is that peripheral venous catheters are an essential part of nursing work, and it is a technique or procedure used to administer fluids, nutrients, drugs, or blood products, the CVP can be related to local or systemic complications such as phlebitis, bacteremia or endocarditis which increases morbidity or mortality during hospital stay (2).

Phlebitis is defined as the inflammation of the venous walls whose principle has different causes, these are: chemical due to the administration of irritating medications, mechanical in the puncture site, the inserted catheter can cause colonization of pathogenic agents found in the skin that migrate towards the venipuncture site (3).

This study will be novel because we will indicate what is the prevalence worldwide with more recent data in the period 2017-2021, this study will present in examining , what is its prevalence of phlebitis, and know the risk factors and what are the nursing care by reviewing scientific documents, this study will be focused on reviewing documents that demonstrate relevant information of phlebitis and the beneficiaries would be all who have to do with the health area whether students, graduates, magister, doctors, specialists, postgraduates the same who will have updated information on phlebitis.

In Spain, phlebitis is the third cause of in-hospital complications with a prevalence of 23-54.5% of patients who present some type of vascular access. The risk factors associated with phlebitis are peripheral vascular trauma, which will depend on the size of the gill, duration, and fixation material (4). On the other hand, in a study conducted in Portugal, the participants presented a mean age of 64 years, 53.4 were women, the mean time of placement of the peripheral venous access was 3.25, the prevalence of phlebitis was 36.7% presented grade 1 phlebitis, the presence of phlebitis was associated with the time of placement of the peripheral venous access (5).

On the other hand, a study conducted by González et al. (6), in Havana in the year 2018 has 2019, 11point prevalence were performed to know the use of peripheral venous catheter and the prevalence of the same, the study group was 2,282 users, of which 1,087 patients had peripheral venous route was found evidence of phlebitis to 63 users it presented a prevalence of 5.8 %.

The general objective is to examine the scientific literature on phlebitis associated with peripheral venous catheter placement through a systematic review.

As specific objectives we have: to identify in the scientific evidence the prevalence, risk factors of phlebitis associated with peripheral venous catheter placement and to describe the main nursing care to avoid phlebitis associated with peripheral venous catheter placement.

Methodology

A bibliographic review was conducted to conduct this process, following the recommendations of the PRISMA method (7).

Search strategy

The research was conducted through the following databases: PubMed, Scopus, ProQuest in the period 2016 and 2021. Those related to the topic with phlebitis associated with peripheral venous catheter placement, incidences, types, risk factors and nursing care, keywords related to the desired objectives, according to the Mesh and DeCS terms: phlebitis, venous catheter, inflammation, nursing care, the connections of these with Boolean connectors "AND" and "OR" were selected. After a first search, each article will be reviewed according to title and abstract, those that had the description of the clinical variables and that exposed phlebitis associated with peripheral venous catheter placement will be included. However, in those cases in which the study methodology was not clear and the results were not very precise, the article will be excluded.

Inclusion Criteria

The selected articles must meet the following parameters

- Year of publication: between 2016 and 2021.
- Studies conducted in phlebitis associated with peripheral venous catheter placement.
- Quality of the articles.
- High impact papers.

Exclusion criteria

- Letters to the editor.

- Impossibility to retrieve the full text of the article.
- Repeated article from a previous search.

Processing

The data obtained were summarized in tables, in which phlebitis associated with peripheral venous catheter placement was presented. The following steps were followed, in the first stage, the topic and the formulation of the research question were identified through the strategy Prevalence or incidence /PEO (Population, exposure and observation), In the second stage, the inclusion/exclusion criteria were applied. In the third stage, an in-depth document review was conducted. In the fourth stage, the synthesis of documents was conducted for the elaboration of results and discussion.

Results

Figure 1.

Flow diagram.

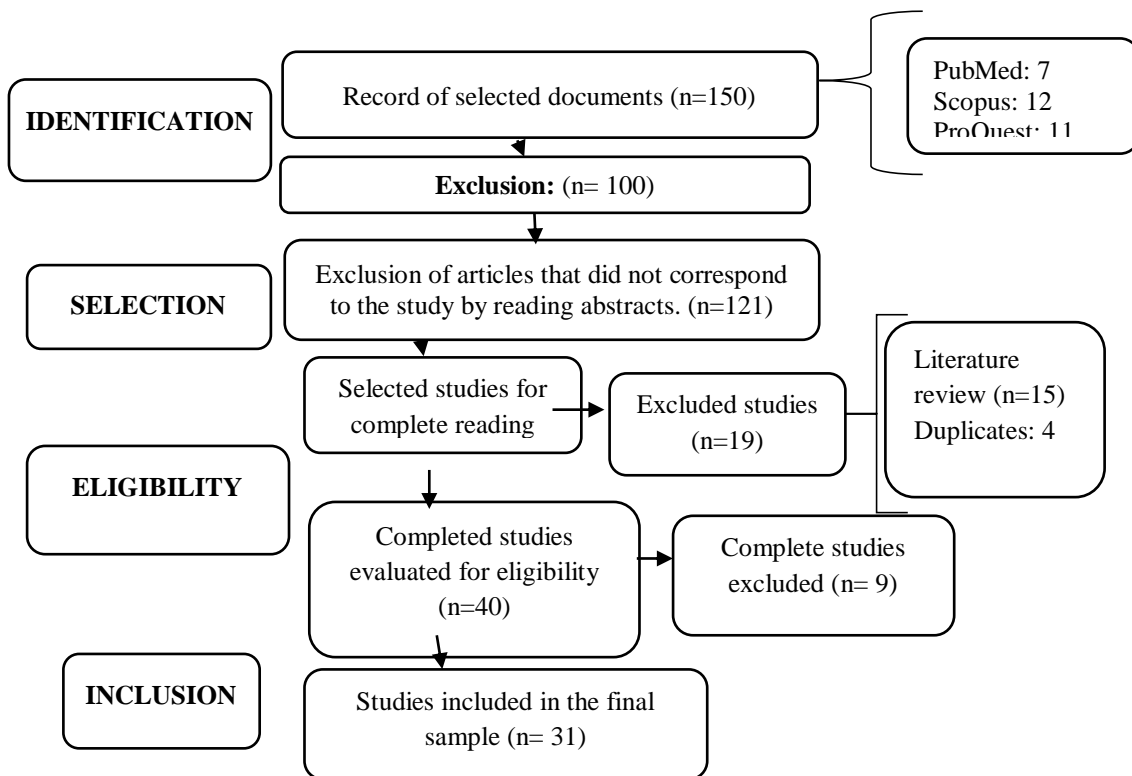


Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process.

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Marsh et al. (8)	2021	Peripheral intravenous catheter failure: a secondary risk analysis	Australia	12%	---	---
Luyu & Jiaquin (9)	2020	The incidence and risk of phlebitis from intravenous catheter infusion with peripheral intravenous catheters: a meta-analysis	Portugal	11,5	---	---
Seven et al. (10)	2019	Point prevalence survey of peripheral venous catheter use in a large tertiary care university hospital in Germany.	Germany	33%	---	---
Larsen et al. (11)	2020	Inherent and modifiable risk factors for peripheral venous catheter failure during cancer treatment: a prospective cohort study.	Germany	7,6%	---	---

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Arias & Suarez (12)	2017	Incidence and risk factors of peripheral intravenous catheter-associated phlebitis	Spain	5,6%	---	---
Annisa & Nurhaeni (27)	2017	Warm water compresses as an alternative to reduce the degree of phlebitis	Indonesian	---	---	They received 0.9% NaCl compresses and those who received 0.9% NaCl received warm water compresses
Santa Ana et al. (19)	2019	Patient safety in the context of reported notifications in a reported in a university hospital	Brazil	---	Age and sex.	---
Braga et al. (20)	2018	Phlebitis and infiltration: vascular trauma associated with the peripheral venous catheter	Brazil	---	Age, venipuncture site, venous catheter caliber, failed attempts, and medications.	---
Munabshe & Mukona (21)	2018	Factors Contributing to Phlebitis in Adult Patients Admitted to patients admitted to the medical-surgical units of a central hospital in Harare, Zimbabwe.	Africa	---	Male gender, HIV, diabetic patients, immunosuppressive drugs, venipuncture site, catlon number 18.	---

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Hong (22)	2020	Development and Effectiveness of the Intravenous Infusion Evidence-Based Nursing Practice Guideline Implementation Program - for Small and Medium Hospitals.	Brazil	---	---	The longer the care time, the lower the probability of the presence of phlebitis in the patient, according to this research.
Pires & Silva (13)	2018	Prevalence of phlebitis associated with peripheral intravenous catheter catheter-associated phlebitis: associated factors	Portugal	36.7 %	---	---
Liu et al. (15)	2020	Incidence, risk factors and medical cost of peripheral intravenous catheter-related complications in hospitalized adult patients.	China	10,5 %	---	---

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Lee & Kim (14)	2019	A model of peripheral intravenous catheter-associated phlebitis in hospitalized orthopedic patients	Brazil	35,9 %	---	---
Umma & Mohammad (16)	2019	Frequency of peripheral intravenous catheter-related phlebitis and related risk factors: a prospective study.	India	18.09 % of grade 1 and 2	Infusion of hypertonic liquids and certain antibiotics such as: amikacin, meropenem, amoxicillin, clavulanic acid, flucloxacillin	---
Abilo et al. (23)	2021	Incidence of intravenous catheter phlebitis and its associated peripheral catheter phlebitis and its associated factors among patients admitted to Gondar University Gondar University Hospital, northwestern Ethiopia.	Ethiopia	-----	Age, gender, residence, religion, admission diagnosis, school education, time of peripheral venous catheter insertion, intravenous drugs.	-----

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Salguero et al. (28)	2019	Nursing practice in peripheral venous catheterization: phlebitis and patient safety.	Portugal	---	---	Select the anatomical site for venipuncture, select the venous catheter caliber, perform hand hygiene and disinfection of materials, properly cannulate, and secure the venous catheter, educate to involve the patient in venous catheter care.
Pinto & Cruz (29)	2017	Indicators for the evaluation of nursing care: a descriptive-exploratory study.	Brazil	----	-----	Know hardening of the venous tract i.e., varicose veins, redness of the affected area, sensation of pain, fever, or discomfort if infection is present.
Abhiyit (24)	2019	Study of the incidence of phlebitis after the use of peripheral intravenous catheter.	India	-----	These were female sex, age less than 60 years, large venous catheters, venous lines placed in emergent situations, administration of medications.	----

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Wen & You (30)	2018	Occurrence of phlebitis	Taiwan	----	----	The staff should monitor the site where the peripheral venous line was placed, the anatomical part should focus on the caliber of the venous catheter, the care should be comfortable and safe, thus increasing the quality of care and avoiding complications such as inflammation, obstruction of the peripheral venous catheter, suppuration.
Bherulal & Musurrat (18)	2020	Factors contributing to phlebitis in patients admitted to third level medical-surgical units.	France	Prevalence of 26 % in the medical areas while in the operating rooms it was 10.2 %.		

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Chen & Xiao (25)	2021	Evaluation of risk factors in time for phlebitis and non-phlebitis related failures when peripheral venous catheters are phlebitis when peripheral venous catheters were replaced as clinically replaced as clinically indicated	Turkey	----	Risk factors were antibiotics such as intravenous flucloxacillin, female gender, site of insertion of the venous line in the dominant hand	----
Chen et al. (26)	2021	Risk factors for peripheral venous catheter failure: a prospective cohort study of 5345 patients.	China	---	They were fluid leakage, age over 60-74 years old, emergency area, poor cannulation practice, administration of irritating fluids, insertion time.	---
Anayanci (31)	2020	Phlebitis: Basic knowledge for nurses	Mexico	---	----	Scientific knowledge of definition, signs and symptoms and nursing performance, using the assessment scale depending on each institution, your diagnosis will be issued to provide your treatment.

Table 1.

Selected articles are ordered as follows: authors, year of publication, title, city, prevalence, risk factors and the nursing process. (continued)

Author	Year	Title	Country	Prevalence	Risk Factors	Nursing care
Altamirano et al. (17)	2018	Phlebitis and pressure ulcers in nursing care, in the Esmeraldas Hospital	Ecuador	5,67%	----	----

Discussion

For the analysis we selected thirty-one articles that helped us answer our research questions about prevalence of phlebitis, risk factors, and nursing care.

Prevalence of phlebitis worldwide

In a study conducted in Australian metropolitan and regional hospitals in the hematology, oncology and operating room medical units, the prevalence of phlebitis was 12% (8). On the other hand, a study conducted in Portugal showed a prevalence of phlebitis of 11.5% in 110 patients with a CVP (9). In a study conducted in Germany in a third level hospital, the prevalence of phlebitis was 33% (10).

A research work conducted by Larsen et al. (11), in Germany showed a prevalence of phlebitis of 7.6%. Likewise, another study conducted in Spain by nursing personnel showed a prevalence of phlebitis of 5.6% (12).

A study conducted in Portugal by Pires & Silva (13), showed a prevalence of phlebitis of 36.7%, which is why it was recommended to reduce the permanence of the peripheral venous line according to the protocols of each institution. According to one study, the prevalence of phlebitis was 35.9% in a hospital in Brazil (14). On the other hand, a study conducted in China by Liu et al. (15), the prevalence of phlebitis was 10.5% in a University Hospital.

In India, the prevalence of phlebitis was 18.09 of grade 1 and 2 (16). A study conducted in Ecuador in a Hospital in Esmeraldas, the prevalence of phlebitis was 5.7%, that is, thirty-two persons (17). A study conducted in France by Bherulal & Musurrat (18), was studied in a tertiary care center in surgical units and medical units with a prevalence of 26% in the medical areas while in the surgical wards it was 10.2%.

Risk factors associated with phlebitis

In a study conducted by Santa Ana et al. (19), in a Brazilian hospital, the risk factors were age and sex. Another study conducted in Brazil by Braga et al. (20), the risk factors were age, venipuncture site, venous catheter caliber, failed attempts, and medications in a study group of 110 patients as a sample.

Likewise, a study conducted in Africa by Munabshe & Mukona (21), identified the following factors: male gender, HIV, diabetic patients, immunosuppressive drugs, venipuncture site, catheter number 18.

The risk factors showed that the higher the ratio of hours, the lower the incidence of phlebitis (22). In a study conducted in India, the most prevalent risk factors were infusion of hypertonic liquids and certain antibiotics such as: amikacin, meropenem, amoxicillin, clavulanic acid, flucloxacillin (16).

In a study conducted in Ethiopia, the risk factors for the appearance of phlebitis were age, gender, residence, religion, admission diagnosis, school education level, time of having a peripheral venous catheter inserted, intravenous drugs (23).

A study conducted in a military hospital in India, the risk factors were female sex, age under 60 years, large venous catheters, venous lines placed in emergent situations, administration of drugs (24).

Chen & Xiao (25), risk factors in a hospital study were age over 65 years, male gender, difficult access veins, anatomical site at the level of the forearm and dorsum of the hand, Teflon catheter 18, 20, 22 imported from New Jersey, United States, poor technique, perfusion solution other than sodium chloride, time of fixation of lines.

The risk factors in a study conducted in a third level hospital in China were fluid leakage, age over 60-74 years old, emergency area, poor cannulation practice, administration of irritant fluids, insertion time (26).

Conclusions

- It is concluded with this systematic review that the prevalence of phlebitis worldwide is high in certain countries, nurses should put more emphasis when performing this procedure: Australia 12%, Portugal 11.5%, Germany 33%, Spain 5.6%, Portugal 36.7%, Brazil 35.9%, China 10.5%, India 18.09, Esmeraldas 5.7%. The nursing staff should have the technique, practice, and knowledge for a prompt action of phlebitis to stop complications that may occur.

- According to this study, the risk factors for phlebitis were age, sex, venipuncture site, large venous catheters, failed attempts, medications, hypertonic liquids, antibiotics such as: amikacin, meropenem, amoxicillin, clavulanic acid, flucloxacillin, emergency area, anatomical site at the level of the forearm and dorsum of the hand, and the presence of a venous catheter.
- The nursing care according to the realization of this systematic review the staff should know the symptoms of phlebitis, monitor the site where the peripheral venous line was placed, the anatomical part should focus on the caliber of the venous catheter, the care should be comfortable and safe achieving increase the quality of the same, thus avoiding complications such as inflammation, treatment can sodium chloride (Na Cl), warm water painkillers if appropriate.

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Conflict of interest

There is no conflict of interest on the part of the investigators.

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