

# TRAINING OF THE NURSING TEAM IN AN INTENSIVE CARE UNIT TO REDUCE THE INCIDENCE OF PHLEBITIS IN A PRIVATE HOSPITAL IN SÃO PAULO

Ana Clara Santos De Lima<sup>1</sup>

Gabriel Dos Santos Bin<sup>2</sup>

Jaqueline Alves Gomes<sup>3</sup>

Milena Beatriz Duarte<sup>4</sup>

Nicolly Da Silva Nunes<sup>5</sup>

Patrycia Stuart<sup>6</sup>

**Abstract:** Phlebitis is an acute inflammatory process affecting a vein where a vascular device has been inserted, which may cause edema, discomfort, pain, hyperemia at the insertion site, and the presence of a palpable fibrous cord along the venous pathway, with or without purulent secretion. Its main causes are related to mechanical, chemical, and bacterial factors. This study aims to develop a training project for the nursing staff of the Intensive Care Unit (ICU) focused on peripheral venous access care and phlebitis prevention, with the objective of reducing its incidence, whether mechanical, chemical, bacterial, or post-infusion, as well as promoting awareness regarding appropriate conduct in the presence of phlebitis according to the institutional protocol. A qualitative approach based on the observational method was used for data collection, enabling the identification of failures in phlebitis prevention processes. In addition, improvements to nursing care practices were proposed through the application of the PDCA cyclical method, using interactive games and slide-based training. The

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1 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes

2 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes

3 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes

4 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes

5 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes

6 Graduandos em enfermagem pela Umc universidade de Mogi das Cruzes



study also presents a quantitative approach, as it aims to reduce the incidence of phlebitis in the ICU by monitoring unit indicators for up to three months after the implementation of the project. During the years 2019 and 2020, adverse events related to phlebitis were reported in the ICU, with an accumulated median of 11.8 and a total of 94 reported cases. With the implementation of this project, the expectation is to reduce the current median from 11.8 to 8. Through the PDCA tool, the study proposes implementing actions such as staff training, educational cards, and the Tasy® alert window, measures expected to optimize safe patient care and reduce phlebitis rates in the unit, contributing to improvements in healthcare assistance. The implementation of this project involves financial and human resources from the institution, especially the nursing team, requiring important internal changes and the engagement of the multidisciplinary healthcare team, supported by the unit coordination. Continuous reassessment of care practices and unit indicators is recommended in order to ensure ongoing education and professional training.

**Keywords:** Patient Care, Catheters, Phlebitis, Clinical Protocols, Intensive Care Unit.

## INTRODUCTION

During the supervised internship and assisted practices in the intensive care unit, provided in the nursing course, a case of chemical phlebitis in the upper limbs was observed, in which amiodarone (ancoron®), an antiarrhythmic, was being administered, indicated when there is an arrhythmic heart disorder that is capable of aggravating the patient's clinical pathology. This drug is among the drugs that cause a high incidence of phlebitis; The therapy was being performed through a peripheral venous catheter in which it was observed that in less than 48 hours the two upper limbs had evolved to phlebitis, so that it was almost impossible for him to move his arms. This event impacted the group and became a trigger for the development of this work.

The peripheral venous catheter is a device used to access the patient's venous network, it is an invasive procedure because it causes the disruption of the natural barrier of the human body.



Through it, it is possible to directly access the veins, it can be used for the administration of nutrients, fluids, blood products, enabling the infusion of volumes and medications, in addition to enabling biological sample collection. It is extremely important for the installation of intravenous therapy, especially in cases of patients in severe condition, thus enabling the administration of volume and several other medications to maintain the hemodynamic and vital status of the patient submitted to it (PHILLIPS, et al, 2001).

Peripheral venous access is most often introduced by the nursing team, although it is a common procedure in the hospital routine, it requires specific skills and care from its insertion to its maintenance, since it is associated with several complications, such as phlebitis, extravasations and infiltrations (Infusion Nurses Society et al, 2011). The site of choice of venous network puncture is of paramount importance, regions such as the arm and forearm should be prioritized, avoiding regions of folds and joints, in addition to the preparation of the insertion site, the technique used in the puncture, the type of dressing, the time of permanence of the access, the type of infusion and the care in handling and maintaining the patency of the catheter are fundamental for the prevention of these events (Machado AF, Pedreira MD, Chaud MN et al, 2008).

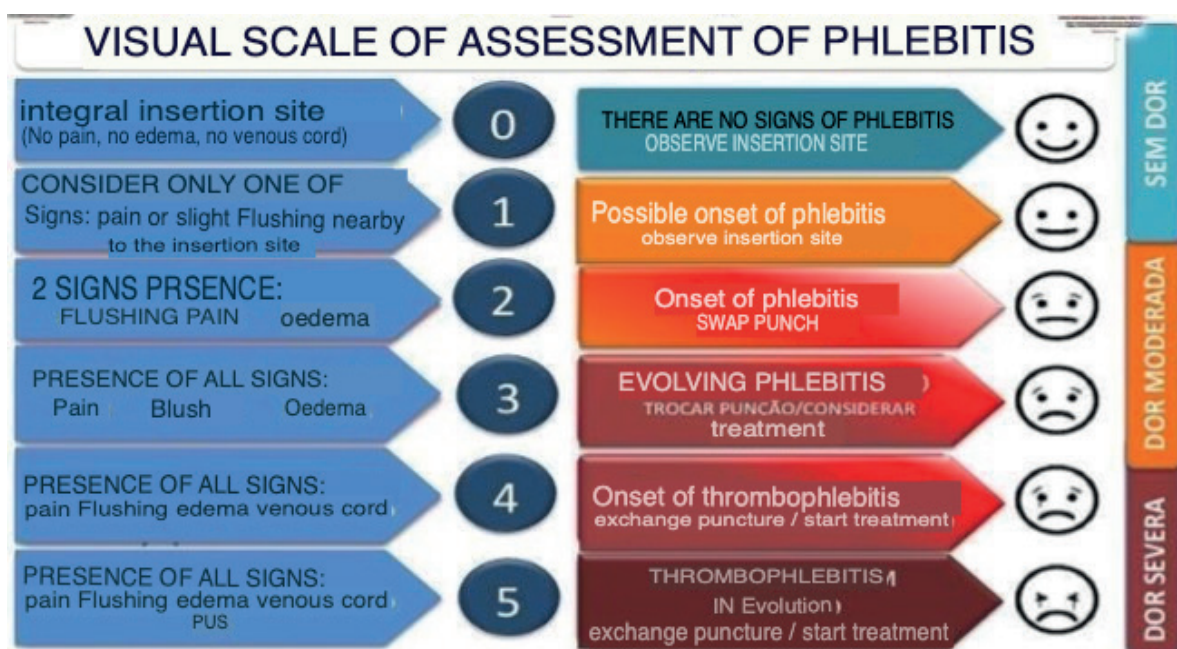
Phlebitis is an acute inflammatory process in a vein in which the device has been introduced, which can cause edema, discomfort, pain, hyperemia at the site, and also a palpable fibrous cord along the vein path, with or without the presence of purulent secretion at the insertion site. Its main causes are mechanical, chemical, and bacterial processes (Royal College of Nursing, 2015). Mechanical processes occur when there is movement of the catheter cannula inside the vein, whether it is due to incorrect fixation or not, causing friction in the venous wall or also when the chosen catheter has a larger caliber than the vein in question can support. Chemical processes occur when the infused medication or solution is irritating, when the medication is diluted inappropriately, when small particles are present in the solution, or when it is infused quickly. Bacterial processes occur when there is an infection in the insertion, causing the bacterium to come into contact with the interior of the vein, either due to a failure in handling or also due to a failure of the aseptic technique at the time



of puncture. And finally, post-infusion phlebitis that occurs after the end of the medication infusion and even after the removal of the device, usually identified within 48 to 96 hours after its removal (Machado AF, Pedreira MD, Chaud MN, 2008).

The nursing team is responsible for the maintenance, care and daily observation of the insertion of the venous access, intervening quickly and effectively when one of the symptoms is found. Phlebitis can be classified as a grade from 1 to 5 according to the Maddox scale, a scale that measures signs, symptoms and pain, thus directing the best conduct for treatment, according to the protocol of each institution (DE SOUZA et al, 2014).

Figure 1. Phlebitis assessment scale – Maddox scale.



Source: <https://enfermagemcuidadosintensivos.blogspot.com/2016/12/escala-visual-evaluation-of-the-flebite.html>.

There are contributing factors to the development of phlebitis in a patient undergoing intravenous therapy in an intensive care unit, such as the catheter insertion technique, the anatomy



of the site, size and type of device, vein caliber incompatible with the catheter, number of puncture attempts at the same site, catheter permanence for more than 72 hours, the severity of the disease, pre-existing infections, irritating and vesicant drugs such as the concentration of the infusions, the patient's clinical condition, the tonicity and pH of the drug or solution, incompatibility between drugs and ineffective filtration (FAVORETTO et al, 2016).

Phlebitis can generate other complications and damage, as well as necrosis of the local tissue, thrombophlebitis, where the thrombus can migrate to the lung, causing a pulmonary embolism and also bloodstream infections. When not treated early and adequately, it can increase the patient's stay in hospitalization, postponing hospital discharge, and can even cause psychological trauma and death, and for the institution it can generate a considerable increase in the cost of hospital care (Machado AF, Pedreira MD, Chaud MN et al, 2008).

The World Health Organization (WHO) by Ordinance No. 529, of April 1, 2013, implemented the National Patient Safety program, one of the main objectives is to propose measures to reduce risks and adverse events, ensuring greater quality and safety in the care provided. An adverse event is characterized by any damage that occurs to the patient directly or indirectly, occurring during care in a health institution, which may result in temporary or permanent disability in his or her life. (Ministry of Health, 2013).

Regardless of its classification, phlebitis is considered an adverse event and can be reported to the Patient Safety Center in the quality and safety department of the Institution, however, grade 5 phlebitis is mandatory to be immediately reported to the responsible medical team and to the Hospital Infection Control Service (SCIH).

That said, the guiding question of this study is: Why is it that after numerous disclosures of phlebitis prevention in institutions, there are still significant complications in intensive care units?



## **OBJECTIVE**

The present study aims to develop and train the nursing staff of the intensive care unit on care with peripheral venous access and prevention of phlebitis, aiming to reduce its incidence, whether mechanical, chemical, bacterial or post-infusion, in addition to making them aware of how to proceed in the presence of phlebitis based on the institutional protocol.

## **METHODOLOGY**

From 06/23/2021 to 06/30/2021 we monitored the care practices of nursing professionals in the afternoon, which consists of 6 nursing technicians, 3 nurses and 2 doctors on duty in the temporary intensive care unit (ICU) due to COVID-19, installed on the third floor of a private hospital in São Paulo, consisting of 15 private beds. A qualitative approach based on the observational method was used for data collection, where it was possible to identify failures in the phlebitis prevention processes. This project aims to suggest improvements to the practice of professionals, according to the institutional protocol, using the cyclical PDCA method, through an interactive game and slide training, carried out simultaneously, for the team of nursing technicians in this unit, to be applied in September 2021. The study also presents a quantitative approach because it aims to reduce the incidence of Phlebitis in the ICU, we will monitor the unit's indicator up to three months after the implementation of the project.

## **PDCA**

PDCA was created in the 1920s by Walter Andrew Shewhart, an American physicist, renowned in the area of statistical quality control, but it was only in the 1950s that the method was popularized, by Professor William Edwards Deming, another scholar dedicated to the improvement



of production processes in the United States.

The PDCA method is a management tool with the objective of promoting the continuous improvement of processes through four actions, which are:

- plan;
- to do (do);
- check;
- act.

Actions are carried out in cycles of simple understanding, not only to identify the emergence of the problem, but also the solution. When improvement is identified, the next step is to take the necessary actions to promote changes and achieve results with greater effectiveness and quality. It is important to note that PDCA happens at the beginning of the planning of actions, but it is not something that happens only once and can change throughout the project, according to the need for a new adaptation. Thus, the PDCA methodology contributes precisely to this control, as it is a continuous method (AGUIAR et al, 2002).

## **PLAN**

Phlebitis is the inflammation of a vein, caused by mechanical, chemical, bacterial factors or after infusion. Its complication is venous involvement, evolving to deep vein thrombosis and consequently to pulmonary embolism and in some cases death. In addition to compromising the patient's recovery, affecting temporarily or temporarily, extending his stay in the intensive care unit and his hospitalization in general. With the intention of reinforcing the knowledge already acquired in a theoretical or practical way by the nursing team, in addition to resuming the importance of avoiding this adverse event, a project was developed by the nursing students, focused on a temporary intensive care unit installed on the third floor of a Private Hospital in São Paulo, with the objective of testing



knowledge in a relaxed way and thus carrying out a survey of the points to be worked on to improve the care provided and reinforcing the importance of applying the Phlebitis protocol established by the institution itself. The tool used to develop the game allows slides to be presented simultaneously, to apply theoretical training along with it, aiming at a better fixation of knowledge, and consequently improvements in care practice and feasibility of protocol information in a fast and safe way, making the actions a routine in the unit.

It will be proposed the implementation of a new window in the Tasy® system, a system currently used in the institution to record nursing notes, in order to evaluate the catheter regardless of its condition, aiming to stimulate the observation of the insertion site frequently during the shift and thus prevent complications or identify them early in order to start the appropriate treatment as soon as possible.

It will also be proposed the delivery of cards (Appendix D), to be used by the professional with the badge, with information about phlebitis, how to identify it, degree of internship and how to proceed, aiming at easy access to information.

## **EXECUTE (DO)**

To identify the points to be worked on, aiming at improving the prevention of Phlebitis, a “Quiz” was developed by the students of the technical nursing course, to be applied to the unit’s nursing team, using the Kahoot Creator® website (Appendix E), with knowledge questions on the subject in question (Appendix A), in addition to the Quiz, slides from the program itself will be presented simultaneously in order to raise awareness and fix the knowledge (Appendix B). Participation gifts will be distributed, regardless of the grade or assertive questions, as a form of incentive to participate in the action. And for the first place in the Quiz, a prize time off will be offered to be agreed with the unit manager.

It will be proposed the implementation of a window in the Tasy® system with the new nursing



care routine, aimed at patients with peripheral venous access, in which the catheter will be evaluated, regardless of its status, with questions pertinent to Phlebitis, such as risk of the injected drug, change of access, conduct taken by the nursing technician and which nurse was notified (Appendix C).

Figure 2. Example of the Tasy® system where the new “tab” can be inserted to evaluate the catheter at risk of phlebitis.



Intervention	12 hour	Interval	Schedules
1 Check Pulse Oximetry	16:00	4x/day	08 14 16
2 observe Phlogistic signs at the punctured site	16:00	3x/day	10 16 22
3 Trocar venous access	16:00		16
4 Apply education plan related to fall prevention.	16:00	3x/day	10 16 22
5 Keep buzzer within reach of patient	16:00	3x/day	10 16 22
6 maintain and guide use of low bed, locked and with high railings, mainly in the ; 16:00		3x/day	10 16 22
7 Keep orange bracelet and guide as to the risk of falling and prevention measures.	16:00	3x/day	10 16 22
8 follow routines and programs PASS126, SA006, RO_SUST036, PG019, PO0029, PR071 e : 16:00		3x/day	10 16 22
9 Note characteristics of vesico-intestinal eliminations	16:00	3x/day	16 00 08

Source: Image taken from the internal system used by the institution as a support tool – TASY.

A card will be delivered that should be used with the employee’s identification badge with information contained in the institutional phlebitis protocol (Appendix D), on how to recognize the complication, degree of internship and how to proceed, aiming at immediate access to the protocol, since it was perceived by the students that the path of the official document is complex and the file is heavy, generating a certain delay to access it. The use of this card does not exempt access to the document, later it will be proposed to the Human Resources team that these cards be delivered at the time of integration.



## **CHECK**

In order to verify the results obtained after the Quiz, awareness training and guidance on the Phlebitis prevention and treatment protocol to the nursing team, after three months a survey of the intensive care unit indices will be carried out, with the purpose of evaluating the improvements achieved. If the objective is achieved, which is to raise awareness and reduce the Phlebitis index, a Coffee Breack will be offered to the sector's care team as a way of recognizing improvements in care practices and the team's commitment focused on the institution's protocol.

## **ACT/ENHANCE (ACT)**

In order to verify the changes achieved in the long term, it will be proposed to fix an acrylic in the nursing station or in the comfort space of the collaborators with information on how long the intensive care unit has been without the occurrence of phlebitis notification, regardless of the degree on the Maddox scale, and with each recorded notification "zero" this statistic, in addition to updating the unit's monthly phlebitis indexes in "Gestão a Vista". And also after a year, we would do a new study to evaluate the results obtained before and after the reorientation on the Phlebitis prevention and treatment protocol for nursing professionals.

## **DISCUSSION AND RESULTS**

According to the project schedule (Appendix F) it would be applied in the period from 09/06/2021 to 09/10/2021, in its first two days, the practice and technique of the employee assigned to take care of the beds of patients who are receiving pharmacological treatment by peripheral intravenous route will be observed. In the following days, a Quiz and training would be applied simultaneously on the topic of Phlebitis to employees, reinforcing the importance of the institutional protocol and the



improvement of care practices.

As previously discussed, an adverse event such as phlebitis can prolong the length of hospitalization, increase costs for the patient and the hospital, and also cause traumas, whether psychological or physiological (FAVORETTO et al, 2016), with this it becomes necessary to use a quantitative instrument that aims to evaluate the quality and performance of the service provided by the nursing team, through a management tool called quality indicator, which aims to understand the work process and the objectives to be achieved, in order to improve the service provided (HADDAD et al, 2011). It is worth emphasizing the importance of reporting such an adverse event and reporting it, not with a punitive but an educational character, as this is a marker of practice that allows us to evaluate the current scenario and make corrections when necessary, later monitoring how effective the improvement actions were in reducing cases. The continuous use of this instrument improves practice in order to avoid damage and complications to the patient.

In the last 2 years (2019/2020) reports of adverse events related to phlebitis were recorded in the ICU, with a cumulative median of 11.8, out of a total of 94 cases reported between the years cited.

Figure 3. Accumulated database for the years 2019/2020/2021 on phlebitis indicator in ICU and Inpatient Unit, Private Hospital.

Accumulated:	Phlebitis - UI	Phlebitis - ICU	Catheter - Day UI	ICU Day Catheter	Phlebitis density UI	Phlebitis density ICU	Median UI/year	Median ICU/year
2019	381	47	43278	4432	8.8	10.6	8.7	11.3
2020	406	47	35159	4844	11.5	9.7	11.8	11.8
2021	69	1	10513	993	6.6	1.0	7.5	0.0

Source: Private Hospital Database, 2026

However, for the application of this project, it is necessary to have the support of the coordination, the interest and availability of the professionals of the nursing team in the sector and the financial resources raised, aiming at the training of the individuals involved and better practices in the



care of peripheral venous catheter within the Intensive Care Unit, consequently reducing its phlebitis rates. With this project we hope to reduce the current median of the ICU from 11.8 to 8.

## **CONCLUSION**

By choosing to develop this final project on the topic of Phlebitis within the Intensive Care Unit, we aimed to identify the points of improvement in the care practice related to the care with peripheral venous catheters, especially in the prevention of the occurrence of Phlebitis and its Institutional protocol, making professionals aware of the importance of caring for the device, from its insertion to maintenance, its daily evaluation, identifying early warning signs so that the treatment can be started in a timely manner. faster and more effective, preventing other complications that generate longer hospitalization time and worsening of the patient's condition and higher costs for the Health Institution. Through the PDCA tool, we aim to implement actions in the unit such as training, the card, the Tasy® window, measures that would contribute to optimizing safe care with the objective of reducing phlebitis rates in the unit, with improvement in the care provided.

The application of this project involves financial and human resources of the Institution, especially of the nursing team, which implies important internal changes with the involvement of the entire care team with the support of the unit's coordination, which is fundamental for this project to have applicability and reach the expected results.

Due to the relevance of the theme, we suggest a continuous reassessment of the unit's care and indexes, ensuring permanent recycling and education to employees periodically and whenever necessary, in order to provide best practices based on scientific evidence, in a humanized way, avoiding causing other damage to patients related to care, ensuring their recovery, well-being and safety.



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