UFSM

REUFSM
REVISTA DE ENFERMAGEM DA UFSM

ISSN 2179-7692
OPEN ACCESS

Rev. Enferm. UFSM, v.13, e29, p.1-15, 2023 •
Submission: 3/21/2023 • Acceptance: 7/25/2023 • Publication: 9/5/2023

Original Article

Flip chart for nurses about the prevention of central venous catheter infections in children*

Álbum seriado para enfermeiros sobre prevenção de infecção de cateter venoso central em crianças

Álbum seriado para enfermeros sobre prevención de infección de catéter venoso central en niños

Thalita Neiva Breda Vettori[I], Eny Dórea Paiva[II], Rita de Cássia Silva[II], Elisa da Conceição Rodrigues[III], Liliane Faria da Silva[II], Rosane Cordeiro Burla de Aguiar[II]

[I] Hospital Federal da Lagoa, RJ, Rio de Janeiro, Brasil
[II] Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brasil
[III] Universidade Federal do Rio de Janeiro, RJ, Rio de Janeiro, Brasil

*** Extracted from the thesis "Elaboration of a flip chart for the handling of subcutaneous port central venous catheters in children with blood cancer", published during the Professional Masters in Direct Assistance Nursing at the Post-Graduation Program at the Universidade Federal Fluminense (UFF), 2019.**

Abstract

Objective: To build a flip chart for nurses about the prevention of subcutaneous port central venous catheter (SP-CVC) infections in children with blood cancer. **Method:** Methodological study carried out in two stages: integrative literature review and production of the flip chart. **Results:** The flip chart includes forms, scripts, and figures that aim to be an easily accessible tool to guide health workers in regard to providing SP-CVC related care to children with blood cancers, presenting a total of 6 images, including its cover. **Conclusion:** We believe that the product at hand is an important tool for the education of nurses, thus contributing to the quality of care.
Descriptors: Educational Technology; Central Venous Catheters; Evidence-Based Nursing; Catheter-Related Infections; Pediatric Nursing

Resumo

Objetivo: construir um álbum seriado para enfermeiros sobre prevenção de infecção de cateter venoso central totalmente implantado (CVC-TI) em crianças onco-hematológicas. **Método:** estudo metodológico, realizado em duas etapas: revisão integrativa de literatura e produção do álbum seriado. **Resultados:** o álbum seriado contém fichas roteiros e figuras ilustrativas voltados para o profissional como forma de orientação e fácil acessibilidade, no momento do cuidado ao CVC-TI na criança onco-hematológica, apresentando 6 ilustrações, juntamente com a capa. **Conclusão:** acredita-se que o produto em questão se constitui como uma ferramenta importante que possibilita o aprendizado para os enfermeiros, contribuindo assim, para qualidade da assistência.
Descritores: Tecnologia Educacional; Cateteres Venosos Centrais; Enfermagem Baseada em Evidências; Infecções Relacionadas a Cateter; Enfermagem Pediátrica

Resumen

Objetivo: elaborar un álbum seriado para enfermeros sobre la prevención de infección de catéter venoso central totalmente implantado (CVC-TI) en niños onco-hematológicos. **Método:** estudio metodológico, realizado en dos etapas: revisión bibliográfica integradora y elaboración del álbum seriado. **Resultados:** el álbum seriado contiene fichas, guiones y figuras ilustrativas dirigidas a los profesionales como forma de orientación y de fácil accesibilidad en el cuidado del CVC-TI en niños onco-hematológicos, presentando 6 ilustraciones junto con la portada. **Conclusión:** Se considera que el producto en cuestión es un instrumento importante que posibilita el aprendizaje de los enfermeros, contribuyendo así para la calidad de los cuidados.
Descriptores: Tecnología Educacional; Catéteres Venosos Centrales; Enfermería Basada en la Evidencia; Infecciones Relacionadas con Catéteres; Enfermería Pediátrica

Introduction

In Brazil and in developed countries, cancer is the disease that causes the most deaths in children and adolescents from 1 to 19 years old (8% of total deaths), considering all regions.[1] Estimates show that from 2020 on, 8,460 new cancer cases in children and adolescents will be diagnosed in Brazil, with an estimate risk of 139.04 per million people for women, and 137.87 per million people for men.[2]

The treatment of a child or adolescent with hematologic cancer often requires several hospitalizations in short periods of time. Therefore, a successful treatment requires a long-permanence vascular venous access that can be reliably used to administer chemotherapy drugs.[3]

Subcutaneous port central venous catheters (SP-CVC) are long-permanence devices used in blood cancer patients for chemotherapy, presenting lower levels of infection, as their manipulation is more restricted. Furthermore, they reduce the high number of peripheral punctures and are not a limit for daily activities, being the first choice of patients and caregivers.[4]

Although the SP-CVC is a safe route for drug administration, there are complications related to its use. Infection and obstruction, the most common of these complications, can be directly associated to an inadequate manipulation of the device. These events can cause the removal of the catheter, require antibiotic use, and even delay chemotherapy treatment.[5]

One of the strategies recommended by the World Health Organization (WHO) and the Joint Commission International (JCI), as part of the international patient safety goals they advocate, is the prevention of health care-associated infections (HCAI), which is an important goal for children under treatment who make use of SP-CVC.[6]

Since this is a highly specific form of care, health workers who are constantly required to deal with this public should have up-to-date knowledge and easy access to strategies and conducts that

are practical and easy to apply. To mediate these actions, we can take advantage of educational technologies, which are tools that allow for reflection in the elaboration, planning, and execution of their products.[7]

The flip chart stands out among these as a visual educational technology that can be used in the educational practices of health workers,[8] as it aids in the production and acquisition of health-related knowledge, reiterating the guidance provided at the time of intervention in order to standardize orientations given in consultations and lectures, while also promoting knowledge.[9]

In this regard, this study is relevant as it creates an easily applicable and accessible educational strategy to improve nursing care, reducing the risks that can emerge from the use of the devices mentioned. These workers bring to their daily lives hospital protocols and routines that are available in a practical, accessible, and dynamic way, and whose content is in accordance with literature, regarding the handling of SP-CVC in blood cancer pediatric patients.

The evidence-based standardization of SP-CVC care is important for a qualified clinical practice, since it allows nurses to follow guidance to carry out their activities and clarifies doubts, providing safety in the execution of procedures through the use of the flip chart, as it is a visual resource that can be routinely used.[10]

Thus, the objective of this study was to create a flip chart for nurses about the prevention of SP-CVC infections in children with blood cancer.

Method

This is a methodological research, a type of research which stands out as a tool to develop, evaluate, and validate research tools and methods.[11] This study was created in two stages: an integrative literature review and the production of a flip chart.

The first stage was the integrative review, based on the review question: What is the scientific evidence regarding complications inherent to the use of SP-CVC in pediatric blood cancer patients? To select the content of the integrative review, we carried out searches from the 10th to the 14th of January 2019 using the SCOPUS electronic database from the Virtual Health Library (VHL) in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American and Caribbean Health Sciences Literature (LILACS), Índice Bibliográfico Español en Ciencias de la Salud (IBECS), and Base de Dados de Enfermagem (BDENF - a nursing database). We used the following health science descriptors in Portuguese and English, according to the DECS and the Medical

Subject Headings (MESH), respectively: "pediatria / pediatrics", "Câncer / neoplasms", "Cateteres Venosos Centrais / central venous catheter" and "complicações / complications" as a qualifier. These descriptors were also combined using the Boolean operator AND.

Inclusion criteria considered original articles in Portuguese, English, or Spanish, published from 2013 to 2018, which reported on complications regarding the use of SP-CVC in pediatric patients with blood cancer. After filtering according to inclusion criteria, we found 151 eligible articles. At first, we read the titles of these articles, after which we carried out a deeper reading of the articles and excluded duplicates. 10 articles were found to fit the profile of this research and, thus, were used for the next stage, the construction of the flip chart.

In the second stage, considering the topics that emerged from the integrative review of literature, we carried out the formatting, design, and created the illustrations for the flip chart, with the aid of a graphic designer hired through the website Fiverr. During the elaboration of the materials, we relied on the experience of the researcher responsible for this investigation in the field of blood cancer. The flip chart was created from October to December 2018.

This study did not involve human beings, nor did it use confidential, institutional, or personal data. The research was entirely based on studies already published in electronic databases, meaning it required no submission to a Research Ethics Committee, according to resolutions 466/12 and 510/2016, which regulate Human and Social Sciences.

Results

The study was divided into two stages. Initially, an integrative review was carried out, synthesizing the evidence; then, the flip chart was produced.

Integrative review

After an analysis of the articles, we selected scientific evidence on the actions to prevent SP-CVC infections, categorized as: hand sanitization, closed-system connections, dressing, aseptic techniques for SP-CVC handling, and permanent education (Table 1).

Categories	Scientific evidence
Hand sanitization	1.Adequate technique for hand sanitization, using water and soap or alcohol 70%.[12-13]
Connections and closed system	1.To rub alcohol on the infusion system ("scrub the hub"), following determinations regarding how long to rub and how long to wait for it to dry up;[14] 2.To replace infusion systems after 96 hours of use, or earlier if there is suspicion of infection;[14] 3. To identify the catheter with the date in which it was inserted and identify the infusion system and its connectors with the date of the last exchange.[15]
Handling of the SP-CVC dressing	1.To use transparent semipermeable sterile dressings or sterile gauze;[12] 2.To rub the site of the catheter with chlorhexidine or alcohol 70% and let it dry;[14] 3. To observe daily signs of infection in the site of insertion and the aspect of the dressing;[16] 4. To wear sterile gloves and a mask to exchange dressings/sterile exchange;[17] 5.To exchange transparent sterile dressings every seven days, or sooner if they are soiled, humid, or loose;[18] 6.Exchange gauze dressings every two days, or sooner if they are soiled, humid, or loose.[18]
Aseptic techniques for SP-CVC handling	1. To wear sterile gloves and a mask to exchange dressings/sterile exchange;[17] 2.To maintain the infusion system closed/use a closed system of infusion;[15] 3.To minimize infusions in the catheter and multiple lines of access;[12-16] 4.To standardize aseptic forms of placing and exchanging infusion systems;[14] 5.To use flush syringes prefilled by their manufacturers or the hospital pharmacy using a sterile technique.[10]
Permanent education	1.Daily evaluation of the need for the catheter;[13] 2.Training in service;[15] 3.To educate health workers regarding recommendations for SP-CVC use, adequate procedures to activate and maintain it, and adequate measures to control infections and prevent health care-associated infections;[15] 4.To guarantee adequate levels of nursing personnel in the services that use SP-CVC to minimize the incidence of HCAI.[19]

We selected the content essential for the production of the educational technology; then, we organized the content proposed chronologically and coherently; the texts were elaborated to form the technology considering the practice of nurses who work with children with SP-CVC. The content was divided into five categories, to organize the evidence: SP-CVC dressing exchange, connections and maintenance of the closed system, aseptic techniques for handling the catheter, antiseptic sanitization of hands, rubbing and alcohol preparations, and personnel improvement.

Construction of the flip chart

The second stage was the construction of the flip chart "Preventing health care-associated infections: a flip chart for professionals". It was formed by introductory images, actions, goals, and descriptions of actions (Figures 1, 2, 3, 4, and 5), with a 12cm x 9cm layout (pocket size). The participants of the technology are the nurse and the child.

Figure 1 - Script for the production of the flip chart to manage SP-CVC: antiseptic hand sanitization and rubbing with alcoholic preparations

ACTION	DESCRIBING THE ACTION	IMAGE
Antiseptic hand sanitization and hand rubbing with alcoholic preparations	Introductory Figure: Nurse cleaning her hands in the hospital. Text on the front side: Preventing and controlling health care-associated infections (HCAI) is a great challenge to current medicine. Since 1846, a simple measure, the proper cleaning of the hands, is considered to be the most important to reduce the transmission of infections in health services. Text on the back: Hand hygiene is the simplest and least expensive measure to prevent the dissemination of health care-associated infections. Goal: To promote the remotion of dirt and microorganisms, reducing the microbial load on one's hands with the aid of an antiseptic. Alcoholic gel, preferably at a 70% concentration, or soap, should be used when the hands are not visibly dirty. Length of the procedure: from 40 to 60 seconds. Technique: 1.Open the faucet and wet your hands, do not touch the sink. 2.Apply on the palm of your hand a sufficient amount of liquid soap to cover all surfaces of the hands (follow the amount recommended by the manufacturer). 3.Rub the palms of your hands against each other to spread the soap. 4.Rub the palm of your right hand against the back of your left hand, interlocking your fingers, do the same on the other side. 5.Inetrlock your fingers and rub the spaces between them. 6.Rub the back of your fingers on one hand with the palm of the other, holding the fingers and making to-and-fro movements. Do the same on the other side. 7.Rub your right thumb with the aid of the palm of your left hand using a circular movement, do the same for the other side. 8.Rub your left finger pulps and nails Against the palm of your right hand, closed in the form of a spoon, making a circular motion, and do the same for the other side. 9.Rub your left fist with the right-hand palm in a circular motion, do the same on the other side. 10.Remove soap residue using water. Avoid direct contact of your hands with the faucet. 11.Dry up your hands with disposable paper towels, starting	

	with your hands and going up to the fists. If the faucet must be closed using your hands, use a paper towel to do so. If you clean your hands by rubbing an alcoholic preparation, rub it until dry and do not use a paper towel.	

Figure 2 - Script for the production of the flip chart to manage SP-CVC: handling of the SP-CVC with aseptic techniques

ACTION	DESCRIBING THE ACTION	IMAGE
Aseptic techniques for SP-CVC handling	Introductory Figure: Nurse wearing a cap and a mask while putting on sterile gloves. Text on the front side: A sterile technique is the first safety barrier of SP-CVC patients, as it prevents microorganisms to invade the ostium or the tunnel of the catheter, which can lead to infection and sepsis. Text on the back: Although the CVC has several associated risks, its use by critical patients is often unavoidable. Therefore, adequate practices in the handling of the catheter are essential for patient safety. Preventive actions: 1.Use an aseptic technique (maximum barrier and sterile materials) to activate, deactivate, and care for the SP-CVC. 2.Standardize aseptic forms of placing and exchanging infusion systems. 3.Keep the infusion system closed/use a closed system of infusion. 4. Minimize infusions in the catheter and multiple lines of access.	

Figure 3 - Script for the production of the flip chart to manage SP-CVC: connections and closed system

ACTION	DESCRIBING THE ACTION	IMAGE
Connections and closed system	Introductory figure: Child with an active SP-CVC and nurse handling catheter connections. Text on the front side: Clearly, hub contaminations can cause catheter-related infections, showing the need for efficient disinfection of the connection before the access. Some studies suggest that rubbing the catheter hub with alcohol 70% for 15 seconds, while exerting a light pressure, reduces the number of bacteria present in these connections. Text on the back: Nursing actions regarding this stage of the work process are simple and do not require the entire team to be present, materials, or supplies. They only require the team to be aware that hand antiseptic sanitization, as well as disinfection of lateral injectors and connections are actions that can save lives. Preventive actions: 1.Use an aseptic technique to handle the SP-CVC connections and exchange the closed system. 2.Replace the systems of administration, including secondary sets and additional devices, after a maximum of 96 hours of use. If there is a suspected or confirmed infection related to the catheter or blood in the circuit, replace the system earlier. 3.Actively rub the infusion system with alcohol 70% and sterile gauze for at least 15 seconds and wait for the alcohol to dry up. 4.Clean the injection ports (lateral hub) with 70% alcohol and sterile gauze before accessing the system. 5.Close all catheter ports when they are not in use.	

Figure 4 - Script for the production of the flip chart to manage SP-CVC: dressing change

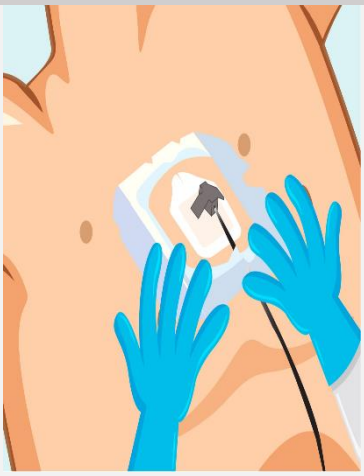
ACTION	DESCRIBING THE ACTION	IMAGE
Changing the SP-CVC dressing	Introductory Figure: Nurse dressing the SP-CVC after its activation in a child. Text on the front side: The dressing is a protection for the place where the needle will be inserted. Alcohol chlorhexidine is the most recommended solution for the antisepsis of the site, due to its residual effect. Text on the back: The dressing change is a unique opportunity to evaluate the presence of phlogistic signs. Furthermore, checking the catheter daily avoids unnecessary delays in the removal of unused lines, since the risk of infection is proportional to the time the catheter remains in the patient. Preventive actions: 1.Use an aseptic technique during the dressing change of the SP-CVC: cap, mask, and sterile glove. 2.Set apart materials: sterile gauze, alcoholic preparation, dressing tray (when there is one), transparent sterile adhesive film. 3.Remove the previous transparent film, put on sterile gloves and rub the site of the catheter with alcoholic chlorhexidine or alcohol 70% in circular movements from inside out, and let it dry. Close it with a new sterile transparent film. 4.Exchange transparent sterile dressings every seven days, or sooner if they are soiled, humid, or loose. 5.Exchange gauze dressings every two days, or sooner if they are soiled, humid, or loose. 6.Identify the new dressing with a data and the name of the professional. Register the procedure in the patient's progress. 7. Observe daily signs of infection in the site of insertion and the aspect of the dressing.	

Figure 5 - Script for the production of the flip chart to manage SP-CVC: permanent education

ACTION	DESCRIBING THE ACTION	IMAGE
Permanent education/personnel improvement	Introductory Figure: Nurse teaching a course for other workers in the hospital environment. Text on the front side: Nurses must be agents that minimize the risks to patients in order to continuously provide them with quality care, since these workers must base their health care actions on scientific evidence. Text on the back: Training sessions and the implementation of measures can reduce the rates of infection on the blood stream fast. Preventive actions: 1.To evaluate, daily, the necessity of a catheter. 2. To provide training sessions at the workplace. 3.To educate health workers regarding recommendations for SP-CVC use, adequate procedures to activate and maintain it, and adequate measures to control and prevent infections and prevent health care-associated infections;<t0/>15 4.To guarantee adequate levels of nursing personnel in the services that use SP-CVC to minimize the incidence of HCAI.	

Discussion

The flip chart, as an educational technology, was created to collaborate to the permanent education of nurses in the direct care of children with blood cancer who are using SP-CVC.

These technologies are tools that can aid the nursing team, more precisely the nurse, orienting them in regard to the care required by the SP-CVC in children with blood cancer, bringing scientific knowledge to the daily practice of these workers.

This flip chart was based on content about: hand sanitization, connections and closed systems, handling SP-CVC dressings, handling SP-CVC with aseptic techniques, and permanent education.

According to the script, the first category is hand sanitization, a characteristic necessary to prevent catheter infections, which was illustrated with the image of a nurse washing her hands.

Blood infections are among the most common causes of complication in patients with CVC. Therefore, it is important to sanitize one's hands to reduce the microbial load on the skin, since a large portion of microorganisms is in the hands of the health workers. This preventive measure is associated to a reduction in infection rates related to the use of any CVC.[12-13]

The worse complications found in a revision study were infections related to the use of SP-CVC, which can take place in the subcutaneous site where the port is placed or throughout the tunnel of the catheter. This can lead to the removal of the catheter and increase the risk of sepsis.[16]

Hand hygiene is one of the main strategies for HCAI prevention. Therefore, Anvisa reiterates the importance of cleaning one's hands before touching a patient; before clean/aseptic procedures; after being exposed to body fluids; after touching the patient; and after touching surfaces near the patient. This can reduce the number of blood infections related with central catheter, since these infections are related to negative outcomes.[17-19]

The second figure shows a nurse wearing a cap, a mask, and sterile gloves, to show an aseptic way of handling the SP-CVC.

A sterile technique is the first safety barrier of SP-CVC patients, as it prevents microorganisms to invade the ostium or the tunnel of the catheter, which can lead to infection and sepsis.

The skin asepsis should be carried out using alcoholic chlorhexidine 0.5%, with circular movements from inside out starting with the center, the location where the SP-CVC is implanted. It should be done three times and then, the nurse must wait 30 seconds for the solution do dry.[6]

A study showed that, with the use of chlorhexidine, the incidence of infections is 50% lower than with the use of povidone-iodine (PVD-I), due to its greater residual action, preventing skin recolonization.[16]

In addition to the antisepsis of the skin to be punctured, materials to be used must also be correctly prepared (simple surgical mask, cap, gauze, sterile gloves, Hubber type needle, 10mL syringes, and glasses), all of which are important measures to prevent SP-CVC infections.[14]

The third illustration is related to a child with an active SP-CVC and a nurse handling the catheter connections.

The contamination of the hub can cause catheter-related infections, which shows the need of an efficient disinfection of the connection before access. Some studies suggest that rubbing the catheter hub with alcohol 70%, while making a light pressure for 15 seconds, reduces the amount of

bacteria lodged in these connections and the formation of intraluminal biofilm. This reiterates the importance of disinfecting the external part of the catheter.[15-20]

The fourth illustration shows the nurse applying a dressing to the SP-CVC in the child after activating it.

The dressing protects the place where the needle is inserted. Alcohol chlorhexidine is the most recommended solution for the antisepsis of the site, due to its residual effect. The use of transparent film as a cover for the dressing is recommended, as it allows an earlier visualization of phlogistic signs.[14]

Regarding the interval between dressing exchanges, the dressing should be changed when it is soiled, loose, or humid. With the exception of these cases, when the cover is made with sterile gauze, it should be exchanged every 48 hours; when a transparent film is used, it should be exchanged every seven days. The nurse should determine the interval according to the product used for the coverage.[6-18]

The closing of the insertion site of the catheter, depending on the technique and the choice of coverage, interferes in the effective protection of the SP-CVC site and in the colonization via microorganisms.[21]

The fifth figure shows a nurse providing a course to other professionals in the hospital environment.

A study showed that training for nurses and implementations of CVC handling measures reduces the rates of primary infections in the blood stream fast.[15]

In the field of health education, gaps in the knowledge of professionals must be made apparent by permanent education in health (PEH), so there can be actions to improve the work process. Therefore, the PEH contributes for health workers to be able to provide better, more conscious work, increasing the quality of health care to children with blood cancer.[21]

Limitations of this study include the lack of published and indexed works regarding the topic for the creation of the flip chart, and the fact the flip chart was not validated by specialists in its conceptual and structural aspects.

Permanent education gives helps health professionals learn, however, its content must always take into account reality, daily work, and the needs of the professional, the work sector, the institution, and the technological evolution. The flip chart can contribute for scientific advancement in nursing oncological pediatrics, allowing the use of these resources in the daily clinical practice of the nurse.

Conclusion

The final product, the tool "Preventing health care-associated infections: a flip chart for professionals", was created both to aid in professional education and in the permanent education of nurses who work in the assistance of the pediatric patient.

Despite little scientific information on the topic, the flip chart was a satisfactory strategy in the field of nursing oncological pediatrics. However, more in-depth research must be carried out in the field.

The use of educational technologies allows improvements to the quality of education and of communication in health care, that is, it means that the information transmitted by the professional to the patient and their relatives is better. Therefore, this flip chart can be used by nurses who work in pediatric hematologic oncology, contributing for a safe assistance, and to reduce the risk of complications related to the use of this device.

In health education, the flip chart can be used by nurses in the field of teaching, research, and clinical care, while also aiding in the production of new educational technologies. The educational technology developed here will later be validated by specialists, to guarantee the reliability of the content, in addition to encouraging new studies, especially in the field of pediatric oncology.

References

1. Instituto Nacional de Câncer (INCA). Câncer infantojuvenil [Internet]. Brasília (DF): INCA; 2022 [acesso em 2022 out 07]. Disponível em: https://www.gov.br/inca/pt-br/assuntos/cancer/tipos/infantojuvenil

2. Lucena NNN, Damascena LCL, Moreira MSC, Lima-Filho LMA, Valença AMG. Caracterização do câncer infantojuvenil no Brasil a partir dos Registros Hospitalares de Câncer (RHC), 2000-2016. Rev Pesq Cuid Fundam. 2022 [acesso em 2023 maio 05];14:e11542. doi: 10.9789/2175-5361.rpcfo.v14.11542

3. Machado LBL, Moura DA, Cunha LBC, Cunha KCS. Característica dos cateteres e de crianças portadoras de doença oncohematológica. Cogitare Enferm. 2017;22(1):01-11. doi: 10.5380/ce.v22i1.48448

4. Rodrigues GLO, Monteles AO, Gomes AF. Caracterização do manuseio do cateter venoso central totalmente implantado em uma unidade ambulatorial quimioterápica de um hospital universitário. Rev Enferm Atual In Derme [Internet]. 2021 [acesso em 2022 nov 01];95(33):e-021043. Disponível em: https://www.revistaenfermagematual.com/index.php/revista/article/view/991

5. Pereira JM, Guedes NG, Silva VM, Carvalho REFL. Development and validation of an instrument to assess the knowledge of oncology nurses about a fully implanted catheter. Rev Rene. 2022;23:e81043. doi: 10.15253/2175-6783.20222381043

6. Ramos MJO, Kameo SY, Amorim BF, Silva GM, Neves SOC, Santos MJO, et al. Manuseio de cateter venoso central totalmente implantado: saberes de graduandos de enfermagem. Rev Enferm Atual In Derme [Internet]. 2020 [acesso em 2022 out 09];93(31):e-020041. Disponível em: https://www.revistaenfermagematual.com/index.php/revista/article/view/748

7. Brasil GB, Rodrigues ILA, Nogueira LMV, Palmeira IP. Educational technology for people living with HIV: validation study. Rev Bras Enferm. 2018;71(Suppl 4):1657-62. 71(Suppl 4):1657-62. doi: 10.1590/0034-7167-2017-0824

8. Saraiva NCG, Cavalcante LM, Araujo TL. Promotion of children's body weight control: serial album validation. Rev Rene. 2020;21:e43642. doi: 10.15253/2175-6783.202021143642

9. Fontenele NAO, Ximenes MAM, Brandão MGSA, Fernandes CS, Galindo Neto NM, Carvalho REFL, et al. Creation and validation of a serial album for the prevention of Pressure Ulcer: a methodological study. Rev Bras Enferm. 2021;74(3):e20201060. doi: 10.1590/0034-7167-2020-1060

10. Dias CCM, Santos NS, Moura JÁ, Silva JC, Costa PSS, Ferreira AGN. Álbum seriado: construção e intervenção educativa com gestantes atendidas no Nordeste do Brasil. Paraninfo Digit Monograf Investiga Salud. 2018 [acesso em 2023 maio 12]:28:e179. Disponível em: http://www.index-f.com/para/n28/e179.php

11. Polit DF, Beck CT. Fundamentos da pesquisa em enfermagem: avaliação de evidências para a prática de enfermagem. 7ª ed. Porto Alegre: ArtMed; 2019.

12. Siqueira DS, Lemos KS, Silva EF. Infecção de corrente sanguínea associada a manuseio de cateter venoso central: revisão integrativa. RECISATEC. 2023;3(3):e33257. doi: 10.53612/recisatec.v3i3.257

13. Ribeiro AMN, Costa GOP, Leite YMR, Pereira ES, Sousa JCR, Rodrigues LMC, et al. Prevention of central venous catheter-related infection: care and knowledge of the nursing team. Res Soc Dev. 2020;9(11):e93091110711. doi: 10.33448/rsd-v9i11.10711

14. Fonseca DF, Oliveira PP, Amaral RAC, Nicoli LHS, Silveira EAA, Rodrigues AB. Protocolo de cuidados com cateter venoso totalmente implantado: uma construção coletiva. Texto Contexto Enferm. 2019;28:e20180352. doi: 10.1590/1980-265x-tce-2018-0352

15. Souza LMS, Silva MCSR, Cardoso JMRM. Manejo de cateteres centrais em recém-nascidos e crianças internadas em unidades de terapia intensiva. Rev Baiana Enferm. 2022;36:e44028. doi: 10.18471/rbe. v36.44028

16. Souza RAP, Carmo TG. Risco de infecção para o cliente oncológico em uso de cateter venoso central totalmente implantado: revisão integrativa. Rev Epidemiol Controle Infecç. 2017;7(4). doi: 10.17058/reci.v7i4.9885

17. Agência Nacional de Vigilância Sanitária (ANVISA). Medidas de prevenção de infecção relacionada à assistência à saúde [Internet]. Brasília (DF): ANVISA; 2017 [acesso em 2022 out 20]. Disponível em: https://www.gov.br/anvisa/ptbr/centraisdeconteudo/publicacoes/servicosdesaude/publicacoes/caderno-4-medidas-de-prevencao-de-infeccao-relacionada-a-assistencia-a-saude.pdf/view

18. Giunchi ME, Pascoali MRS, Silva ER. Cateter venoso central totalmente implantável: conhecimento dos enfermeiros do pronto socorro. REASE. 2022;8(11):1980-96. doi: 10.51891/rease.v8i11.7783

19. Agência Nacional de Vigilância Sanitária (ANVISA). Nota Técnica nº 1/2018. Orientações gerais para higiene das mãos em serviços de saúde [Internet]. Brasília (DF): GVIMS/GGTES/ANVISA; 2018 [acesso em 2022 out 20]. Disponível em: https://www.gov.br/anvisa/ptbr/centraisdeconteudo/publicacoes/servicosdesaude/notas-tecnicas/2020/nota-tecnica-01-2018-higienizacao-das-maos.pdf

20. Guerin K, Wagner J, Rains K, Bessesen M. Reduction in central line-associated bloodstream infections by implementation of a postinsertion care bundle. Am J Infect Control. 2010;38(6):430-3. doi: 10.1016/j.ajic.2010.03.007

21. Rocha JR, Silva JOM, Costa M, Makuch DMV. Conhecimento de técnicos e auxiliares de enfermagem sobre cuidados com cateteres centrais em um hospital pediátrico. Rev Baiana Enferm. 2018;32:e25718. doi: 10.18471/rbe. v32.25718

Author Contributions

1 – Thalita Neiva Breda Vettori
Nurse, Professional MS in Nursing Care - thalitaneiva@id.uff.br
Research concept and development

2 – Eny Dórea Paiva
Nurse, Concluded Post-Doctorate Studies - enydorea@id.uff.br
Research conception and development

3 – Rita de Cássia Silva
Corresponding author
Nurse, Professional MS in Nursing Care - ritinhasil58@gmail.com
Writing of the manuscript

4 – Elisa da Conceição Rodrigues
Nurse, PhD - elisaconceicao@gmail.com
Revision and approval of the final version

5 – Liliane Faria da Silva
Nurse, PhD - lilianefaria@id.uff.br
Revision and approval of the final version

6 – Rosane Cordeiro Burla de Aguiar
Nurse, PhD - rosaneburla@id.uff.br
Revision and approval of the final version

Chief Scientific Editor: Cristiane Cardoso de Paula

Associate Editor: Aline Cammarano Ribeiro

How to cite this article:

Vettori TNB, Paiva ED, Silva RC, Rodrigues EC, Silva LF, Aguiar RCB. Flip chart for nurses about the prevention of central venous catheter infections in children. Rev. Enferm. UFSM. 2023 [Access at: Year Month Day]; vol.13, e29: 1-15. DOI: https://doi.org/10.5902/2179769274640