

EVALUATION OF MAINTENANCE CARE FOR PERIPHERAL VENUE CATHETERS THROUGH INDICATORS

AValiação dos cuidados de manutenção de cateteres venosos periféricos por meio de indicadores

EVALUACIÓN DEL CUIDADO EN EL MANTENIMIENTO DEL CATÉTER VENOSO PERIFÉRICO POR MEDIO DE INDICADORES

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ABSTRACT

Objective: to analyze the maintenance care of peripheral venous catheters through indicators. **Method:** prospective observational study with quantitative approach, performed in medical clinic units of adult patients. A checklist was elaborated to obtain the data, consisting of the indicators “care with dressings and lines”, “handling of installed devices” and “adequate records”. Data collection was performed by direct observation of the patient and consultation of the medical record. The data were organized and analyzed in spreadsheets, which enabled the accounting of conformities and nonconformities of the evaluated practices. **Results:** there were 642 applications of the checklist. In the indicator “care with dressings and lines”, the “expiring date of peripheral venous catheter” component had the highest compliance rate (98.8%), and the “dressing conditions” component had the highest non-compliance (85.0%). In the indicator “handling of installed devices”, the component “protects the site while bathing” was the most compliant (85.6%), and the largest non-compliance was observed in “disinfection of connections” (89.7%). The indicator “adequate records” had a high rate of non-compliance (99.8%). The positivity index was determined to assess the quality of care. It was adequate for the “expiring date of peripheral venous catheter” component and safe for the “protects the site while bathing” component. The other components achieved poor or borderline quality of care. **Conclusion:** the evaluation of peripheral venous catheter maintenance care identified the weaknesses and allowed to propose strategies focused on the needs of the team, aiming to improve the care provided.

Keywords: Nursing Care; Catheterization, Peripheral; Quality Indicators, Health Care; Patient Safety; Health Evaluation.

RESUMO

Objetivo: analisar os cuidados de manutenção de cateteres venosos periféricos por meio de indicadores. **Método:** estudo observacional prospectivo, com abordagem quantitativa, realizado em unidades de clínica médica de pacientes adultos. Elaborou-se um checklist para a obtenção dos dados, composto pelos indicadores “cuidados com curativos e linhas”, “manuseio dos dispositivos instalados” e “registros adequados”. A coleta de dados foi realizada por observação direta do paciente e consulta ao prontuário. Os dados foram organizados e analisados em planilhas eletrônicas, que possibilitaram a contabilização de conformidades e não conformidades das práticas avaliadas. **Resultados:** ocorreram 642 aplicações do checklist. No indicador “cuidados com curativos e linhas”, o componente “cateter venoso periférico no prazo de validade” apresentou o maior índice de conformidade (98,8%), e o componente “condições do curativo” obteve a maior não conformidade (85,0%). No indicador “manuseio dos dispositivos instalados”, o componente “protege o local para banho” mostrou-se o mais conforme (85,6%), e a maior não conformidade foi observada em “desinfecção das conexões” (89,7%). Já o indicador “registros adequados” apresentou alto índice de não conformidade (99,8%). Determinou-se o índice de positividade para avaliar a qualidade da assistência. Esta se apresentou adequada

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no componente "cateter venoso periférico no prazo de validade" e segura para o componente "protege o local para banho". Os demais componentes alcançaram qualidade da assistência sofrível ou limítrofe. **Conclusão:** a avaliação dos cuidados de manutenção do cateter venoso periférico identificou as fragilidades e permitiu propor estratégias focadas nas necessidades da equipe, objetivando melhorar o cuidado prestado.

Palavras-chave: Cuidados de Enfermagem; Cateterismo Periférico; Indicadores de Qualidade em Assistência à Saúde; Segurança do Paciente; Avaliação em Saúde.

RESUMEN

Objetivo: analizar los cuidados en el mantenimiento de los catéteres venosos periféricos a través de indicadores. **Método:** estudio observacional prospectivo con enfoque cuantitativo, realizado en unidades de clínica médica de pacientes adultos. Se preparó una lista de verificación para obtener los datos en que constan los indicadores "cuidados con apósitos e hilos", "manejo de dispositivos instalados" y "registros adecuados". La recogida de datos se realizó por observación directa del paciente y consulta de su historial. Los datos fueron organizados y analizados en planillas electrónicas, lo cual permitió la contabilidad de las conformidades y no conformidades de las prácticas evaluadas. **Resultados:** en la lista de verificación había 642 aplicaciones. En el indicador "cuidados con apósitos e hilos", el componente de "catéter venoso periférico dentro del plazo de validez" tuvo el mayor índice de conformidad (98,8%), y el componente de "condiciones del apósito" tuvo el mayor índice de no conformidad (85,0%). En el indicador "manejo de los dispositivos instalados", el componente "proteger el sitio para bañarse" fue de mayor conformidad (85,6%), y el de mayor no conformidad se observó en "desinfección de las conexiones" (89,7%). El indicador "registros adecuados" presentó un alto índice de no conformidad (99,8%). Se determinó el índice de positividad para evaluar la calidad de la atención, adecuada para el componente "catéter venoso periférico dentro del plazo de validez" y segura para el componente "proteger el sitio para bañarse". Los otros componentes lograron calidad asistencial deficiente o en el límite. **Conclusión:** la evaluación del cuidado en el mantenimiento del catéter venoso periférico identificó las debilidades y permitió proponer estrategias centradas en las necesidades del equipo, con el objetivo de mejorar la atención brindada.

Palabras clave: Atención de Enfermería; Cateterismo Periférico; Indicadores de Calidad de la Atención de Salud; Seguridad del Paciente; Evaluación en Salud.

INTRODUCTION

Peripheral venous catheter (PVC) is a widely used therapeutic resource in the hospital setting for intravenous therapy (IVT). More than 70% of patients admitted to hospital require PVC, which makes it one of the most commonly performed procedures in these institutions.¹ It is indicated for the administration of drugs, fluids, transfusion of blood derivatives and emergencies, when rapid access to bloodstream is necessary.²

Although the implementation of PVC is widespread, technical procedural failures are often performed and incorporated into practice without discussing the risks to patients.³ In most cases, the use of PVC contributes to

patient improvement, but if not properly used, it can lead to complications, the most common being phlebitis, infiltration, hematoma, thrombosis and thrombophlebitis.⁴

Such complications can be considered health care failures, cause harm to patients and are defined as an adverse event (AE).⁵ AEs lead to increased health care costs, prolonged hospitalizations, and significant patient discomfort during treatment.⁶

In assisting patients with PVC, Nursing plays a fundamental role, since it is almost always the professionals responsible for the insertion, maintenance and implementation of infection prevention and control measures and other AEs.³ One of the ways to prevent these events is in the selection of appropriately sized catheters, site selection, sterile insertion technique, and administration of liquids and drugs in appropriate amounts and concentrations.^{2,6} Add to these initiatives the need to maintain a trained Nursing staff with frequent evaluations aimed at identifying weaknesses in the performance of the insertion and maintenance technique.

Among the strategies used to ensure quality care for patients with PVC, the Technical Work Instruction Manual is available at the institution studied, which defines the care that leads to the prevention of AEs associated with PVCs.⁷ Although several activities provided for in this document are already implemented, there is a need for systematic follow-up of PVC maintenance care to detect which ones need reinforcement.

In this sense, the use of indicators is a strategy that allows such monitoring. Quality indicators are defined as resources used to assess care practices, processes and services to identify whether outcomes are desirable or undesirable.⁸

Given this, the development of this study, which proposes to analyze the maintenance care of peripheral venous catheters through indicators becomes relevant. This study may contribute to the recognition of weaknesses related to this care, enabling the increase of educational activities.

METHOD

This is a prospective observational study with a quantitative approach, conducted in two medical clinic units for adult patients of a university hospital, general and public, in the city of Belo Horizonte – MG.

The study population consisted of all patients admitted during the data collection period who met the following inclusion criteria: both sexes, older than 18 years, had a short peripheral puncture catheter, which was punctured in the units studied, were able to sign the Informed Consent Form (ICF) or were responsible for doing so after agreeing to participate in the research. Patients who did not meet these criteria were excluded.

An instrument was elaborated for data collection and was called "Peripheral Venous Catheter Maintenance Checklist",

consisting of procedural indicators related to the care of PVC. To validate the checklist, it was applied to patients who met the inclusion criteria but were not part of the final sample. The necessary modifications were made, and the instrument was presented to the Catheter Group of the institution that approved it. The instrument also had instructions to fill in with the necessary guidelines on each item. These contributed to the application of the checklist to occur in a homogenous manner.

Data collection was performed by two of the previously trained researchers. It was given by direct observation of the patient and consultation of the medical records, when the checklist was completed according to each proposed indicator. Data collection was made from January to March 2018, once every 24 hours, on working days.

It was recorded in the checklist the patient's sociodemographic and clinical data, puncture-related data, and indicators of PVC maintenance care. The following indicators were evaluated:

- **“care with dressings and lines”, composed of four components:** proper dressing conditions, PVC exchange period within the expiration date, equipment labeled with date and exchange period within the expiration date;
- **“handling of installed devices”, consisting of four components:** hand hygiene before and after handling the infusion lines, use of procedure gloves, disinfection of the connections before handling them, and site protection for shower for drugs administration. For these items to be completed in the checklist, they had to happen at the time of data collection, which was not observed on some occasions;
- **“adequate records”, consisting of eight components:** at least one record per shift informing the existence of the PVC, the puncture site, whether salinized or infusing medication, whether or not there are phlogistic signs, the puncture date and signature and stamp of the professional who made the registration. In case the registry was informing the puncture of the PVC, it was necessary to specify the type of peripheral venous catheter used.

Conformity of each item was evaluated, and those that had multiple components were considered “compliant” when all components were also found to be.

In order to classify the quality achieved by each indicator, we used the methodology suggested by Carter*, 1982, adopted in other studies that evaluated the quality of care through indicators.⁹⁻¹⁰ Thus, the quality of care (QoC) was categorized according to the positivity index (PI), where positivity represented compliance. To be classified as “desirable assistance”, the PI should achieve 100% positivity; for “adequate care” from 90 to 99%; “safe care” from 80 to 89%; “borderline assistance”, from 71 to 79% and “poor assistance”, up to 70% positivity.

Data were organized and analyzed in spreadsheets using Microsoft Office Excel 2007*. To characterize the population, the absolute and relative frequencies of the demographic and clinical variables were calculated. The conformities and nonconformities of the evaluated practices were presented in absolute numbers and in percentage distribution.

The project was submitted to the Research Ethics Committee of the *Universidade Federal de Minas Gerais* and approved under Protocol N° 068/2017. All study participants or their designee signed the informed consent, in accordance with Resolution N° 466/12 of *Conselho Nacional de Saúde – CNS/Ministério da Saúde* (BR).

RESULTS

During the period of the study, 231 patients were hospitalized in the referred units, and 189 had at least one PVC during data collection. Of this total, 85 were excluded because they did not meet the inclusion criteria. Thus, 104 patients were part of the study. As there were patients with more than one PVC, 354 devices were evaluated. Six hundred and forty-two applications of the checklist were made, with a total of 11.365 observations, taking into account the sum of indicators and their components.

Of the total of patients, 53 (51.0%) were female and 51 (49.0%) male. Regarding the age group, 47 (45.2%) were 60 years old or older; 43 (41.3%), from 30 to 59 years old; and 14 (13.5%), from 18 to 29 years old. Regarding the underlying disease of the patients, there was a predominance of diseases of the cardiovascular system, which corresponded to 35 (33.6%) of cases, followed by digestive system diseases with 15 (14.4%), respiratory with 14 (13.5%), circulatory with 13 (12.5%), immunological with 12 (11.5%), urinary with six (5.8%), neurological with three (2.9%) and six (5, 8%) cases were other affected systems. The length of stay of the evaluated PVCs was: 165 (46.6%) devices remained one to two days, 173 (48.9%) three to four days and 16 (4.5%) longer than four days.

In the evaluation of the indicator “care with dressings and lines”, 5.908 observations were made. In the component “adequate dressing conditions”, the total conformity was evaluated by the sterile dressing items, with visible insertion site, clean, well stabilized, with date of puncture and name of the responsible professional. Six hundred and forty dressings were evaluated, of which 96 (15.0%) were compliant and 544 (85.0%) non-compliant. The highest rates of non-compliance were related to the “name of professional in charge” of the components, found in 423 (66.1%) of the evaluations, followed by “visible insertion site” in 351 (54.8%) of the evaluations (Table 1).

The component “PVC exchange period within the expiration date” presented 634 (98.8%) compliant observations

and eight (1.2%) non-compliant observations. The “equipment labeled with date” component had a total of 393 evaluations, revealing 295 (75.1%) compliant and 98 (24.9%) non-compliant. Regarding the component “period of change of equipment within the expiration date”, of the 393 observations, 294 (74.8%) were compliant and 99 (25.2%) non-compliant (Table 1).

There were 626 observations regarding the “handling of installed devices” indicator. The component “hand hygiene before and after handling the infusion lines” had 38 observations, being non-compliant in 30 (78.9%) and compliant in eight (21.1%). For the component “use of procedure gloves for drug administration”, 42 observations were made, with 22 (52.4%) non-compliant and 20 (47.6%) compliant. In the component “disinfects the connections before handling them”, 35 (89.7%) non-compliant and four (10.3%) compliant were observed. The 507 observations regarding the component “protects the site while bathing” showed 434 (85.6%) compliance (Table 2).

The indicator “adequate records” had a total of 4.831 observations, when all its components were added together. We evaluated 604 records in medical records, showing 603

(99.8%) non-compliant. For the component “at least one record per shift reporting the existence of the PVC”, 550 (91.1%) complied. In the “puncture site” component, of the 604 observations, 598 (99.0%) were non-compliant and six (1.0%) complied. And in the “if salinized or infusing medication” component, there were 517 (85.6%) compliances and 87 (14.4%) non-compliances (Table 3).

Of 550 observations concerning the “presence or absence of phlogistic signs” component, 527 (95.8%) were non-compliant and 23 (4.2%) compliant. The component “PVC puncture date” showed 496 (82.1%) compliant and 108 (17.9%) non-compliant. In the component “signature of the professional who made the registration”, 549 (90.9%) were compliant and 55 (9.1%) non-compliant. The “stamp of the registered professional” component obtained compliance in 552 (91.4%) observations and non-compliance in 52 (8.6%). In the records that informed the performance of the puncture, the component “type of peripheral venous catheter used” was evaluated and the results were 20 (37.7%) with compliance and 33 (62.3%) with non-compliance (Table 3).

Table 1 - Compliance index for the “Care with dressings and lines” indicator and their components. *Belo Horizonte, 2018*

Care with dressings and lines	Observations	Compliant		Non-Compliant	
	N	n	(%)	n	(%)
a. Dressing Conditions	640	96	15.0	544	85.0
a.1. Sterile	640	525	82.0	115	18.0
a.2. Visible insertion site	640	289	45.2	351	54.8
a.3. Clean	640	620	96.9	20	3.1
a.4. Well stabilized	640	569	88.9	71	11.1
a.5. With date of puncture	640	601	93.9	39	6.1
a.6. Name	640	217	33.9	423	66.1
b. PVC within the expiration date	642	634	98.8	8	1.2
c. Device labeled with date	393	295	75.1	98	24.9
d. Device within the expiration date	393	294	74.8	99	25.2
Total	5,908				

Source: research data.

Table 2 - Conformity index of the indicator “handling of installed devices” and their components. *Belo Horizonte, 2018*

Handling of installed devices	Observations	Compliant		Non-Compliant	
	N	n	(%)	n	(%)
Hand hygiene	38	8	21.1	30	78.9
Use of procedure gloves	42	20	47.6	22	52.4
Disinfection of the connections (with 70% alcohol)	39	4	10.3	35	89.7
Protects the site while bathing	507	434	85.6	73	14.4
Total	626				

Source: research data.

Table 3 - Compliance index of the “appropriate records” indicator and its components. *Belo Horizonte, 2018*

Adequate records	Observations	Compliance		Non-Compliance	
	N	n	(%)	n	(%)
a. Adequate records	604	1	0.2	603	99.8
a.1 At least 1 record per shift	604	550	91.1	54	8.9
a.2. Puncture site	604	6	1.0	598	99.0
a.3. Salinized or infusing medication	604	517	85.6	87	14.4
a.4 Informing if there are phlogistic signs	550	23	4.2	527	95.8
a.5 Informa data	604	496	82.1	108	17.9
a.6. Signature	604	549	90.9	55	9.1
a.7. Stamp	604	552	91.4	52	8.6
a.8. Type of PVC	53	20	37.7	33	62.3
Total	4.831				

Source: research data.

The instrument also made it possible to verify the reason that led to the removal of the device. It was identified that 74 (20.9%) were due to phlogistic signs, 72 (20.3%) due to the expiration date of the PVC, 34 (9.6%) due to the end of intravenous therapy, 30 (8.5%) due to hospital discharge, 28 (7.9%) related to device problems, 17 (4.8%) related to suspected infiltration, 17 (4.8%) due to accidental withdrawal, eight (2.3%) due to the patient’s death, eight (2.3%) were discharged from the unit, five (1.4%) were due to suspected phlebitis, and 61 (17.2%) could not identify the reason for withdrawal.

Based on the Nursing QoC classification criteria, the “PVC exchange period within the expiration date” component had a positivity index of 98.8%, which corresponds to adequate care. The component “protects the site while bathing” had a positivity index of 85.6%, which corresponds to a safe care. The components “equipment labeled with date” and “equipment replacement period within the expiration date” were classified as borderline assistance. The other components achieved the classification of poor care (Table 4).

DISCUSSION

Health services are increasingly committed to achieving a high level of health quality and, therefore, it is necessary to use tools to measure this quality, and the indicators are one of the most used. The constant use of indicators improves the quality of care by identifying the activities that need the most attention, monitoring and evaluating the quality of care being provided.¹¹

This study revealed that almost half of the patients remained with the device for one to two days, i.e. less time than recommended. Patients that remained with PVCs for more than four days had the difficulty of puncturing a new device due to the clinical conditions of the patients or no proper monitoring of the expiration date of the PVC. The permanence time of PVC recommended in the literature is 96 hours, however, if a suspected contamination, any complication or malfunction of the device is identified, it should be removed. If the catheter exchange needs to be extended for clinical reasons, good catheter practice should be strictly followed.¹²

Table 4 - Quality of care characterized by evaluated components and indicator, according to positivity index. *Belo Horizonte, 2018*

Components and Indicator	Positivity Index (PI)	Quality of Care
	(%)	(QoC)
Dressing conditions	15.0	Poor assistance
PVCwithin the expiration date	98.8	Proper assistance
Equipment labeled with date	75.1	Borderline Assistance
Equipment within the expiration date	74.8	Borderline Assistance
Hand hygiene	21.1	Poor assistance
Use of procedure gloves	47.6	Poor assistance
Disinfection of the connections (with 70% alcohol)	10.3	Poor assistance
Protects the site while bathing	85.6	Safe Assistance
Adequate records	0.2	Poor assistance

Source: research data

By examining data on the “care of dressings and lines” indicator, the “proper dressing conditions” component showed a high rate of non-compliance, achieving poor quality of care. Among the items evaluated, the absence of the name of the professional responsible for the puncture and non-visible insertion site was the one that stood out as non-compliant.

Although the use of a sterile dressing was more frequently identified, it was, in some situations, accompanied by non-sterile microporous tape at the edges to aid in stabilization, and it was observed that in approximately half of the evaluated devices it was not possible to visualize the insertion site. Failure to use the transparent dressing or its occlusion, making it impossible to see the insertion site, may corroborate the late identification of warning signs and, consequently, generate serious damage to the patient. According to ANVISA¹², the dressing should be made with sterile semi-permeable transparent cover and evaluated at least once per shift. Retrospective study, performed through analysis of medical records and reports related to the manipulation of central venous catheters, observed that the sterile transparent film has more adaptability to body contours, facilitates the visibility of the insertion site and helps as a barrier to contamination.¹³

In this study, the evaluations of the components “equipment labeled with date” and “period of equipment exchange within the expiration date” corresponded to rates of borderline assistance. Handling installed equipment, particularly when infusion lines are connected or disconnected, increases the risk of system contamination. Thus, this handling should be as safe as possible, and the dates required to exchange as recommended. Nursing care with the equipment refers to its identification and exchange according to type and purpose, aiming at the prevention of infections and consequent damage to the patient.¹⁴ The *Agência Nacional de Vigilância Sanitária – ANVISA (BR)*¹² recommends that continuous infusion equipment should be changed within 96 hours. and those with intermittent infusion every 24 hours.

Considering the indicator “handling of installed devices”, the “hand hygiene before and after handling infusion lines” component showed a high rate of non-compliance, and this result represents poor assistance. Even the institution providing the appropriate physical structure and materials to perform this practice, it was detected its non-habit in the routine of professionals. Hand hygiene (HH) is recognized as one of the main practices for prevention and control of healthcare-associated infections (HAIs). It is a method that has low cost and great benefit, reducing the transmission of microorganisms between patients. Although evidence ensures the effectiveness of hand hygiene in the face of decreasing infection rates, adherence of professionals remains low, as shown in this study.^{15,16}

The component “use of procedure gloves for drug administration” presented assistance also considered poor.

The use of gloves is an individual protection feature that ensures the safety of the practitioner against exposure to contaminated materials, tissue, blood or body fluids and thus prevents cross infection. Gloves are recommended for invasive or non-invasive care procedures, but that involve a biohazard, such as venipuncture, medication administration, dressings, catheterization, among other procedures.¹⁷

The component “disinfects the connections before handling them” obtained a high rate of non-compliance. The disinfection action with alcoholic solutions of PVC hubs and connectors reduces intraluminal contamination but was rarely recorded in the data collection. This result corroborates a study conducted in two intensive care units aimed at adult patients, which found that of the 223 opportunities for evaluating these practices, only 17.5% of Nursing professionals performed disinfection of hubs and connectors with alcoholic chlorhexidine.¹⁸ Other survey also shows that, out of 131 professionals, 55.0% reported performing the practice of hub disinfection before administering medication in central venous catheter (CVC), but the remaining 53.3% reported that they did not perform it due to lack of time and not knowing the ideal time to accomplish it.¹⁹

Disinfection of connectors using an alcohol-based antiseptic solution prior to each manipulation is advised, applying movements to generate mechanical friction for five to 15 seconds to prevent intraluminal contamination and consequent catheter-related infection.¹² This is also a difficult practice to follow because presence is required at the time of manipulation; thus, its incorporation by the team will also be related to the understanding of its importance.

In the present study, the component “protects the site while bathing” showed high compliance, corresponding to a safe assistance. Its evaluation was made mainly by asking the patient if the care was performed. There were patients who reported having been advised by professionals about not having to cover the venous access site for the bath, as it is impermeable covering.

Although the dressing is made of polyurethane film, it does not allow sealing and complete protection of the insertion site if it comes in contact with water. It is recommended to protect PVC and connections with plastic or other impermeable material during bathing, making it difficult to introduce microorganisms at the insertion site.^{12,20}

The indicator “adequate records” had only one note considered as compliant. The high value of non-compliance reflects the fragility of the data obtained from the medical record consultation. There were few observations on catheter conditions, especially their exact location, specifying only left or right upper limb. Specifying the exact puncture site does not appear to be a practice of the professionals but is important because it assists in identifying a compromised area that should be avoided in the next puncture. In the records,

the absence of PVC puncture dates was also observed, as well as date records that did not match the reality, as there were differences between the date recorded in the medical record and the date present in the PVC dressing. The evaluation of the catheter for phlogistic signs, which should be performed per shift, has been poorly recorded.¹²

Nursing records consist of pertinent patient information and care provided, with the purpose of establishing communication between the Nursing staff and the various health areas involved in the continuity of care, as well as for research, audits, legal processes, planning and others.^{21,22}

A study by Setz and D'Innocenzo²³ found that only 8.7% of the notes were considered good, 64.6%, fair and 26.7%, poor. Although they did not use the same evaluation criteria of this study, the data also revealed the highest incidence of incomplete records.

Among the reasons for PVC removal, the most frequent were phlogistic signs. In cases where the appearance of phlogistic signs is identified, catheter removal is indicated, as inflammation may favor the development of an infection.^{12,20}

FINAL CONSIDERATIONS

According to the results found, we can see that Nursing care related to the maintenance of PVC is still a challenge to be faced to achieve safe and quality care. The indicator on "adequate records" was the one that obtained the most non-compliance, along with the "handling of installed devices", being the indicator that composes infection prevention actions, such as hand hygiene, which is a subject discussed worldwide.

It was found that the presence of the researchers during the data collection period promoted the improvement of care with the PVCs by health professionals, because care was not initially performed, such as writing the name of the person responsible for the puncture in the dressing, placing the date on the equipment and use of the sterile transparent dressing became more frequent throughout the research. This fact proved that the improvement of many indicators is related to the day-to-day adoption of a behavior based on a safety culture and that the Nursing technical team has the necessary knowledge to adopt it.

Although the present study has assessed the compliance and non-compliance of PVCs care maintenance in detail, it has limitations. The application of maintenance checklist is difficult to operate, since there are cautions that are not observed at the time of execution, being dependent on notes in the medical record, and these may have been performed and not noted. This fact certainly has repercussions on the findings. A longer follow-up period will also generate more accurate data for the evaluation.

It is hoped that the results found here may contribute to the adherence of professionals to infection prevention practices and

that institutions create care and educational improvement actions aimed at the desirable Nursing care. The evaluation of Nursing care allowed identifying weaknesses, and from this, it is necessary to promote strategies focused on the needs of the institution and its professionals, in order to improve the care provided.

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