UFSM

REUFSM
REVISTA DE ENFERMAGEM DA UFSM

ISSN 2179-7692
OPEN ACCESS

Rev. Enferm. UFSM, v.16, e4, p.1-18, 2026 •
Submission: 08/04/2025 • Acceptance: 02/24/2026 • Publication: 05/15/2026

Original article

Educational intervention on peripheral intravenous catheter using I-DECIDED® on the knowledge of pediatric nursing professionals

Intervenção educativa sobre cateter intravenoso periférico com I-DECIDED® no conhecimento de profissionais da enfermagem pediátrica

Intervención educativa sobre catéter intravenoso periférico con I-DECIDED® en el conocimiento de profesionales de enfermería pediátrica

Isadora Silva de Souza[I], Thiago Lopes Silva[I], Bianka Sousa Martins Silva[II], Bruna Figueiredo Manzo[III], Aline de Souza Bitencourt[I], Jefferson Wildes da Silva Moura[I], Gillian Ray-Barruel[IV], Patrícia Kuerten Rocha[I]

[I] Universidade Federal de Santa Catarina (UFSC), Florianópolis, Santa Catarina, Brazil
[II] Universidade Estadual de Feira de Santana (UEFS), Feira de Santana, Bahia, Brazil
[III] Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Minas Gerais, Brazil
[IV] The University of Queensland (UQ), Brisbane, Queensland, Austrália

Abstract

Objective: To evaluate the effect of an educational intervention based on the I-DECIDED® tool on the knowledge of pediatric nursing professionals regarding the peripheral intravenous catheter. **Method:** A quasi-experimental before-and-after study conducted in a pediatric inpatient unit in Southern Brazil, with the participation of 27 nursing professionals between 2023 and 2024. Data collection occurred in two stages: pre-intervention and post-intervention. A pre- and post-intervention questionnaire composed of 49 questions was applied, of which 19 were analyzed in this study, addressing complications, infection prevention, and coverage/stabilization of the peripheral intravenous catheter. The educational intervention included a theoretical presentation of the I-DECIDED® tool, low-fidelity simulation, and provision of educational materials. **Results:** An increase in correct answers was observed post-intervention in 11 (68.8%) of the questions related to peripheral intravenous catheter assessment. In the self-assessment questions, all responses progressed from "partially agree" to "totally agree." **Conclusion:** The educational intervention based on the I-DECIDED® tool resulted in an increase in correct responses after the intervention, indicating improved knowledge among professionals regarding complications, infection prevention, and coverage/stabilization of the peripheral intravenous catheter.

Descriptors: Catheterization, Peripheral; Pediatric Nursing; Clinical Decision-Making; Catheter-Related Infections; Health Education

Resumo

Objetivo: Avaliar o efeito de uma intervenção educativa baseada na ferramenta I-DECIDED® sobre o conhecimento de profissionais da enfermagem pediátrica a respeito do cateter intravenoso periférico. **Método:** Estudo quase experimental, do tipo antes e depois, realizado em uma unidade de internação pediátrica no Sul do Brasil, com a participação de 27 profissionais de enfermagem, entre 2023 e 2024. A coleta de dados ocorreu em duas etapas: pré-intervenção e pós-intervenção. Foi aplicado um questionário pré e pós-intervenção composto por 49 questões, das quais 19 foram analisadas neste estudo, abordando complicações, prevenção de infecção e cobertura/estabilização do cateter intravenoso periférico. A intervenção educativa incluiu apresentação teórica da ferramenta I-DECIDED®, simulação de baixa fidelidade e disponibilização de materiais educativos. **Resultados:** Observou-se aumento de acertos pós-intervenção em 11 (68,8%) das questões relacionadas à avaliação do cateter intravenoso periférico. Nas questões de autoavaliação, todas as respostas evoluíram de "concordo parcialmente" para "concordo totalmente". **Conclusão:** A intervenção educativa baseada na ferramenta I-DECIDED® resultou em aumento das respostas corretas após a intervenção, indicando melhora no conhecimento dos profissionais sobre complicações, prevenção de infecção e cobertura/estabilização do cateter intravenoso periférico.
Descritores: Cateterismo Periférico; Enfermagem Pediátrica; Tomada de Decisão Clínica; Infecções Relacionadas a Cateter; Educação em Saúde

Resumen

Objetivo: Evaluar el efecto de una intervención educativa basada en la herramienta I-DECIDED® sobre el conocimiento de profesionales de enfermería pediátrica acerca del catéter intravenoso periférico. **Método:** Estudio cuasiexperimental, de tipo antes y después, realizado en una unidad de hospitalización pediátrica en el Sur de Brasil, con la participación de 27 profesionales de enfermería, entre 2023 y 2024. La recolección de datos se llevó a cabo en dos etapas: preintervención y postintervención. Se aplicó un cuestionario pre y postintervención compuesto por 49 preguntas, de las cuales 19 fueron analizadas en este estudio, abordando complicaciones, prevención de infecciones y cobertura/estabilización del catéter intravenoso periférico. La intervención educativa incluyó presentación teórica de la herramienta I-DECIDED®, simulación de baja fidelidad y disponibilidad de materiales educativos. **Resultados:** Se observó un aumento de aciertos postintervención en 11 (68,8%) de las preguntas relacionadas con la evaluación del catéter intravenoso periférico. En las preguntas de autoevaluación, todas las respuestas evolucionaron de "de acuerdo parcialmente" a "totalmente de acuerdo". **Conclusión:** La intervención educativa basada en la herramienta I-DECIDED® resultó en un aumento de las respuestas correctas después de la intervención, lo que indica una mejora en el conocimiento de los profesionales sobre complicaciones, prevención de infecciones y cobertura/estabilización del catéter intravenoso periférico.
Descriptores: Cateterismo Periférico; Enfermería Pediátrica; Toma de Decisiones Clínicas; Infecciones Relacionadas con Catéteres; Educación en Salud

Introduction

Peripheral intravenous catheters (PIVC) are fundamental devices in clinical practice, as they enable the administration of intravenous fluids, medications, and blood products. In pediatrics, they represent the most frequently performed invasive procedure.[1]

Nursing professionals hold a central responsibility in implementing and maintaining evidence-based practices to reduce risks associated with PIVC. This approach requires not only continuous updating on best recommended practices but also their effective application in the care setting.[2] Adopting best practices directly contributes to pediatric patient safety and to the continuous qualification of the team, which are essential factors for high-quality care and for minimizing device-related complications.[3]

Pediatric patients with chronic conditions, severe comorbidities, or acute diseases, as well as those undergoing prolonged hospitalization, present a higher risk of PIVC insertion failure.[4] These patients are also more susceptible to complications due to the complexity of their clinical conditions and the challenges associated with the use of this device.[4]

Most complications related to catheter use are non-infectious, with phlebitis, infiltration, and extravasation being the most prevalent. Other complications may also occur, although less frequently, and are relevant in pediatrics, such as occlusion, dislodgement, and infectious complications, including primary bloodstream infection (PBSI).[5-6] PBSI is one of the main causes of morbidity and mortality in the hospital setting, considering that more than 50% of health care-associated infections are directly associated with the use of PIVC.[7]

Infection prevention thus plays a central role. The Infusion Therapy Standards of Practice, from the Infusion Nurses Society, recommend the implementation of appropriate care, such as the use of aseptic non-touch technique in PIVC management, disinfection of connectors, appropriate use of personal protective equipment, and strict adherence to hand hygiene protocols.[8]

Furthermore, appropriate selection of the type of dressing for catheter stabilization has a multifactorial impact on PIVC performance and on the reduction of device failure.9 Effective stabilization minimizes dislodgement, a particularly relevant issue in the pediatric context, and reduces micromovements that may cause vascular trauma, clinically manifesting as infiltration, extravasation, and phlebitis.[10]

According to the Brazilian Health Surveillance Agency,[11] the catheter dressing must be sterile, and the use of non-sterile materials, such as common adhesive tape or

microporous tape, is contraindicated. The use of semipermeable transparent film is recommended, as it allows continuous visualization of the insertion site and is not associated with an increased risk of local infection.[11] Because of the complexity and risks associated with the use of PIVCs, implementing structured tools that support health professionals, especially nursing staff, in the systematic assessment and appropriate management of these devices is essential.

In this context, the I-DECIDED® tool stands out, whose objective is to guide health professionals in conducting systematic assessments of PIVC and in making clinical decisions based on these evaluations.[12-14] Developed in Australia, this tool consists of a mnemonic based on international scientific evidence, created to support clinical assessment and decision-making in intravenous therapy (IVT).[12]

The I-DECIDED® tool comprises eight steps and guides the team in a detailed analysis of PIVC. This assessment includes verification of venous device functionality, identification of complications at the insertion site, infection prevention, evaluation of dressing and stabilization, as well as guidance to the patient and family regarding catheter management, culminating in the documentation of the final clinical decision.[8,12-15]

Recently, the tool was translated and adapted into Brazilian Portuguese,[15] and has been implemented in a pediatric clinical setting in Brazil, where it demonstrated positive results.[16]

Despite these advances, there is a gap in the literature regarding the evaluation of the impact of this tool on the knowledge and self-assessment of nursing professionals, especially in pediatric contexts. This lack of evidence reinforces the need for studies that contribute to the continuous improvement of care for children using PIVC. In this scenario, educational interventions based on structured tools, such as I-DECIDED®, represent a promising strategy by integrating systematic assessment and evidence-based clinical decision-making in PIVC management.

The aim of this study was to evaluate the effect of an educational intervention based on the I-DECIDED® tool on the knowledge of pediatric nursing professionals regarding the peripheral intravenous catheter.

Method

This is a quasi-experimental, before-and-after study conducted with a dependent/paired sample of nursing professionals working in a Pediatric Inpatient Unit. The study followed the guidelines of Transparent Reporting of Evaluations with Nonrandomized Designs,[17] which establish criteria to ensure transparency and quality in the reporting of studies evaluating interventions without randomization,[18] as well as the recommendations of the Revised Standards for QUality Improvement Reporting Excellence.

The study was conducted in a pediatric inpatient unit located in Southern Brazil, from April 2023 to November 2024. The sample was intentional and non-probabilistic, including all nursing professionals working in the unit who were invited to participate in the study. The final sample consisted of 27 professionals: 18 nursing technicians, 7 nurses, and 2 nursing assistants.

The inclusion criteria were being a nursing professional and actively working in the unit during the data collection period. Non-inclusion criteria included nursing professionals who were on leave during the study period. Participants who withdrew at any stage of the study were excluded. All eligible professionals who agreed to participate signed an informed consent form.

The study began after contact with the unit leadership and nursing teams, at which time the study objectives and procedures were presented. The invitation to participate was made in person, in a single attempt, through a verbal presentation of the study to all eligible professionals. Data collection was scheduled across different shifts to allow participation without compromising patient care.

For data collection, the instrument “Pre- and Post-Intervention Questionnaire” was used, developed based on the I-DECIDED® tool and previously reviewed by two specialists in intravenous therapy and pediatrics. The questionnaire consisted of two parts: participant characterization and a set of identical questions in the pre- and post-intervention versions. The instrument contained 49 questions, including 32 related to the assessment and clinical decision-making regarding PIVC, distributed across the eight items corresponding to the I-DECIDED® tool, and 17 self-assessment questions

regarding professionals' practice and perception of assessment and clinical decision-making related to PIVC, also based on the eight items of the tool.

The questions related to assessment and clinical decision-making regarding PIVC consisted of statements classified as correct or incorrect, with up to five response options. Participants completed the questionnaire using a clipboard and pen, under researcher supervision, to prevent external consultation and reduce potential response bias.

The self-assessment questions had no correct or incorrect answers and were presented using a Likert scale, with the following response options: "totally agree," "partially agree," "neither agree nor disagree," "partially disagree," and "totally disagree." Participants responded according to their own perception of the I-DECIDED® tool items.

The questions analyzed in this study focused on three items of the I-DECIDED® tool: complications, infection prevention, and PIVC dressing/stabilization. In total, 19 questions were analyzed: four related to complications (three assessment and one self-assessment); 12 related to infection prevention (11 assessment and 1 self-assessment); and 3 related to dressing/stabilization (2 assessment and 1 self-assessment).

During questionnaire analysis, it was observed that some participants did not answer certain questions in the post-intervention stage. Therefore, in calculating the percentages of correct responses, the denominator considered was the actual number of responses obtained for each question, rather than the total number of participants.

The study was conducted in three stages: pre-intervention, educational intervention, and post-intervention. All stages occurred in a single session, with an approximate total duration of 50 to 60 minutes (pre-intervention: 10-15 minutes; educational intervention: 30 minutes; post-intervention: 10-15 minutes), carried out between April and May 2023.

During the data collection stage, participants initially completed the "Pre- and Post-Intervention Questionnaire." Between the pre- and post-intervention applications, an educational intervention on the I-DECIDED® tool was conducted. The intervention was structured into three components: a dialogued theoretical presentation of the tool, supported by audiovisual resources developed in Canva (2023 Canva Pty Ltd, Australia); a low-fidelity simulation in which clinical cases were presented using a mannequin with

PIVC; and distribution of educational materials to professionals, including posters, cards, and pamphlets, which were also displayed in the unit for continuous reference.

In the post-intervention stage, the questionnaire was reapplied to identify possible changes in participants' responses after the educational intervention, compared with those provided in the pre-intervention stage.

Data were processed and analyzed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used for participant characterization, with results presented in tables containing absolute and percentage frequencies.

For the analysis of dichotomous categorical variables (correct and incorrect responses), McNemar's test was applied to assess statistical significance, adopting a significance level of $p \leq 0.05$. For comparison of self-assessment responses, analyzed as ordinal data from a Likert scale, the nonparametric Wilcoxon signed-rank test was used, appropriate for paired samples. To ensure participant masking, each professional received a unique identification number, maintained in both pre- and post-intervention stages.

The study complied with ethical principles for research involving human subjects, in accordance with Resolutions No. 466/2012, No. 510/2016, and No. 580/2018 of the Brazilian National Health Council. The study was approved by the Human Research Ethics Committee of the Universidade Federal de Santa Catarina, under opinion No. 5,965,146/2023, approved on March 27, 2023, with CAAE No. 64135122.9.0000.0121.

Results

The study included 27 nursing professionals. There was a predominance of females, with 25 participants (96.2%). Age ranged from 30 to 60 years, with most professionals, 17 (62.9%), aged between 30 and 50 years. Regarding professional category, the sample consisted of 18 nursing technicians (66.7%), 7 nurses (25.9%), and 2 nursing assistants (7.4%) (Table 1).

Regarding additional education, 6 participants (22.2%) reported having completed or incomplete higher education, while another 6 (22.2%) reported having no

additional training. Most professionals, 15 (55.5%), reported having postgraduate education, either lato sensu or stricto sensu (Table 1).

Concerning length of work in the unit, most participants, 15 (55.5%), had worked in the sector for 1-10 years, while 10 professionals (37%) had 11-30 years of experience in the unit. For this item, 2 participants did not respond (Table 1).

Table 1 – Characterization of nursing team professionals in the pediatric inpatient unit, Brazil, 2025

Variables	n (%)
Sex	
Female	25 (96.2)
Male	2 (7.4)
Age, years	
30-50	17 (62.9)
51-60	10 (37.0)
Role	
Nurse	7 (25.9)
Nursing technician	18 (66.7)
Nursing assistant	2 (7.4)
Education	
Nurse	10 (37.0)
Nursing technician	16 (59.3)
Nursing assistant	1 (3.7)
Years since graduation	
1-20	16 (59.3)
> 21	11 (40.7)
Other employment	
No	18 (66.7)
Yes	9 (33.3)
Additional education	
Completed and incomplete higher education	6 (22.2)
Lato sensu and *stricto sensu*	15 (55.5)
None	6 (22.2)
Length of work in the unit* (n = 25), years	
1-10	15 (60.0)
11-30	10 (40.0)

*Variable not answered by all professionals

The results of the post-intervention questionnaire indicated an improvement in the number of correct responses after the educational intervention, with some of these differences reaching statistical significance ($p < 0.05$). Overall, there was an increase in the number of correct responses in 11 (68.8%) of the questions related to PIVC assessment (Table 2).

In the item related to complications associated with PIVC, an increase in the number of correct responses was observed in all three questions after the educational intervention. In the question related to signs of phlebitis, the number of correct responses increased from 15 (55.6%) in the pre-intervention to 27 (100%) in the post-intervention ($p \leq 0.001$). There was also a significant improvement in responses regarding signs of infiltration and extravasation, with an increase from 14 (51.9%) to 26 (96.3%) correct responses ($p = 0.002$). Regarding the question about types of phlebitis, there was an increase in correct responses from 10 (37%) to 15 (55.6%), although the difference did not reach statistical significance ($p = 0.063$) (Table 2).

Among the 11 questions related to infection prevention, 8 showed statistically significant differences ($p < 0.05$) in the percentage of correct responses after the intervention. Notably, the question regarding friction time for connector disinfection showed an increase of 19 (70.4%) in the number of correct responses ($p \leq 0.001$) (Table 2).

In the item related to catheter dressing and stabilization, there was a marked increase in correct responses in the question regarding dressing change frequency, rising from 8 (29.6%) in the pre-intervention to 22 (81.5%) in the post-intervention ($p \leq 0.001$). Additionally, three questions maintained a total correct response rate in both stages, with 27 correct responses (100%): importance of infection prevention, drying of disinfectant after connector disinfection, and ideal characteristics of PIVC dressing (Table 2).

Table 2 – Evaluation of correct responses by nursing professionals on complications, infection prevention, and PIVC dressing/stabilization before and after the educational intervention in the pediatric inpatient unit, Brazil, 2025

Variables	Pre-intervention	Post-intervention	p-value*
	n (%)	n (%)	
Signs of phlebitis	15 (55.6)	27 (100)	≤ 0.001†
Types of phlebitis	10 (37)	15 (55.6)	0.063
Signs of infiltration and extravasation	14 (51.9)	26 (96.3)	0.002†
Importance of infection prevention	27 (100)	27 (100)	—
Main actions for infection prevention	12 (44.4)	24 (88.9)	0.002†
Moments indicated for hand hygiene	16 (59.3)	24 (88.9)	0.021†
Recommended products for hand hygiene	5 (18.5)	15 (55.6)	0.002†
Connector disinfection process	16 (59.3)	26 (96.3)	0.006†
Moments indicated for connector disinfection	17 (63)	26 (96.3)	0.004†
Recommended disinfectants for connector disinfection	14 (51.9)	24 (88.9)	0.013†
Friction time for connector disinfection	4 (14.8)	23 (85.2)	≤ 0.001†
Drying time of disinfectant in connector disinfection	27 (100)	27 (100)	—
Ideal technique for PIVC handling	12 (44.4)	23 (85.2)	0.003†
Aseptic non-touch technique	8 (29.6)	12 (44.4)	0.289
Ideal dressing characteristics	27 (100)	27 (100)	-
Dressing change	8 (29.6)	22 (81.5)	≤ 0.001†

*McNemar test. †Statistically significant values at p < 0.05

In the three self-assessment questions related to assessment and clinical decision-making regarding PIVC, changes were observed in all participant responses, which shifted from “partially agree” to “totally agree” after the educational intervention (Table 3).

Regarding the importance of assessing catheter-related complications, the percentage of total agreement increased from 19 (70.4%) in the pre-intervention to 25 (96.3%) in the post-intervention (p = 0.008). Regarding the importance of infection prevention, 26 participants (96.3%) already totally agreed in the pre-intervention, increasing to 27 (100%) in the post-intervention. Regarding the importance of assessing

catheter dressing, there was also an increase in total agreement responses, from 19 (70.4%) to 25 (92.6%) (Table 3).

For the question "Do you consider it important to assess the presence of catheter-related complications?", one participant did not respond to the post-intervention questionnaire (n = 26) (Table 3).

Table 3 – Self-assessment of nursing professionals regarding the evaluation of complications, infection prevention, and dressing/stabilization before and after the educational intervention in the pediatric inpatient unit, Brazil, 2025

Variables	Pre-intervention	Pre-intervention	Valor p*
	n (%)	n (%)	
Do you consider it important to assess the presence of catheter-related complications?† (n = 26)			
Partially agree	8 (29.6)	1 (3.7)	0.008‡
Totally agree	19 (70.4)	25 (96.3)	
Do you consider it important to assess the presence of infection?			
Partially agree	1 (3.7)	0	0.317
Totally agree	26 (96.3)	27 (100)	
Do you consider it important to assess dressing?			
Partially agree	8 (29.6)	2 (7.4)	0.058
Totally agree	19 (70.4)	25 (92.6)	

*Wilcoxon test. †Variable not answered by all professionals. ‡Statistically significant value at $p < 0.05$

Discussion

The results of this study demonstrated a positive effect of the educational intervention on the knowledge of pediatric nursing professionals regarding the assessment and clinical decision-making related to PIVC, especially concerning complications, infection prevention, and device dressing/stabilization, as well as self-assessment of professional practice. This effect was evidenced by the increase in the number of correct responses in the post-intervention stage.

These findings are consistent with recent scientific evidence. Quasi-experimental studies have demonstrated that the implementation of educational interventions significantly contributes to improving nursing professionals' knowledge about IVT, resulting in increased knowledge scores and reduced incorrect responses.[19-20] Similarly,

an observational study that evaluated the effectiveness of an educational intervention directed at these professionals showed that its application contributed to reducing complications associated with PIVC and to improving clinical practice in this context.[21]

The statistically significant increase observed in 11 (68.8%) of the questions assessed in this study reinforces the relevance of pedagogical initiatives that promote critical reflection on professional practice, fostering continuous transformation processes in health education.[22]

Although PIVC is the most widely used venous device in clinical practice, a discrepancy still exists between evidence-based recommendations and their application in daily care. This gap is particularly evident in the pediatric context, where failure and complication rates related to device management remain high, reinforcing the need for structured educational strategies, such as the intervention based on the I-DECIDED® tool.[23]

The results of this study demonstrated improvement in professionals' knowledge regarding complications associated with PIVC, especially in recognizing signs of phlebitis, infiltration, and extravasation, with a marked increase in post-intervention scores, reaching up to 26 (96.3%) correct responses. Phlebitis and infiltration are among the main causes of PIVC failure and may cause pain, discomfort, and impairment of patient quality of life, in addition to increasing hospital costs due to the need for additional interventions.[24]

Recognition of the importance of assessing complications also resulted in greater agreement in professionals' self-assessment responses. Appropriate PIVC management by the nursing team is essential for preventing these complications, as evidenced by studies showing the relationship between effective management practices and the reduction of device-related adverse events.[24-25]

Thus, the knowledge promoted by the educational intervention contributes to improving care practice, favoring appropriate use of PIVC, patient safety, and the implementation of evidence-based care practices in health services that use this device.[19,26]

Regarding infection prevention, eight of the 11 (72.7%) questions assessed showed statistically significant differences in professionals' knowledge after the

educational intervention. Although the remaining three questions did not reach statistical significance, an upward trend in correct responses was also observed for these variables.

The results of this study, which showed significant improvement in knowledge about infection prevention measures, reveal a possible discrepancy between perception and practice. Although professionals recognize, through self-assessment, the importance of evaluating infections related to PIVC, studies indicate that adherence to recommended practices remains below expected levels in various care settings.[26-27]

Among the assessed items, the question related to friction time for connector disinfection showed the highest level of statistical significance ($p \leq 0.001$), highlighting the relevance of this knowledge for clinical practice. Inadequate disinfection of connectors may favor contamination and biofilm formation, increasing the risk of PBSI.[27]

The question related to dressing characteristics showed a correct response rate of 27 (100%) in both the pre- and post-intervention stages. This result may be explained by factors such as prior professional experience, continuous training in catheter care, and frequency of performing the procedure, aspects that, according to a study conducted in ten hospitals in Indonesia, directly influence professionals' performance in this type of assessment.[23]

Regarding dressing change, an increase in correct responses to 22 (81.5%) was observed after the educational intervention. This result highlights the positive impact of the educational strategy, which aimed to reinforce knowledge about the importance of PIVC dressing and stabilization. Ensuring adequate dressing and stabilization of the device is an essential nursing care practice, as it contributes to preventing complications and reducing the risk of catheter dislodgement, reinforcing the relevance of these practices in the clinical context.[10]

However, total agreement regarding the importance of dressing assessment did not reach 27 (100%), which deserves attention. Dressing integrity must be continuously monitored, and the use of sterile, transparent dressing that allows visualization of the insertion site and facilitates clinical assessment is recommended.[3,28] Partial adherence to this item suggests the need to reinforce professionals' awareness of the importance of this systematic evaluation.

Despite the advances observed after the educational intervention, some aspects still require further investigation in future studies. Previous studies on educational interventions directed at nursing professionals show that these strategies are effective in improving perception, knowledge, and care practices. However, they highlight the need for continued investigations that incorporate systematic educational approaches to strengthen health education and consolidate changes in clinical practice.[29-30]

The educational intervention adopted in this study proved to be a low-cost and easily implementable strategy in the hospital environment. Its simplicity and accessibility favor broad applicability in different health services, contributing to the updating of best practices in PIVC management and to strengthening pediatric patient safety.

Among the study limitations, it is noteworthy that it was conducted in a single inpatient unit of one hospital, which restricts the generalization of the results to other institutional contexts. In addition, the immediate application of the post-intervention questionnaire may have influenced participants' responses, as the presented content could still have been in the process of consolidation. This is compounded by the absence of a control group.

Additionally, although the p-value was used to indicate statistically significant changes between the pre- and post-intervention moments, the sample was intentional and non-probabilistic, which also limits the generalization of the findings.

Despite these limitations, the present study offers relevant contributions to clinical practice in pediatric nursing. The results demonstrate that the educational intervention based on the I-DECIDED® tool is an effective strategy to improve professionals' knowledge and to stimulate self-assessment of their practices. These findings reinforce the importance of continuous health education as a means of encouraging the use of evidence-based tools, contributing to improving patient safety and the quality of care related to the peripheral intravenous catheter.

Conclusion

The results of this study indicate that the educational intervention based on the I-DECIDED® tool contributed to increasing nursing professionals' knowledge

regarding complications, infection prevention, and dressing/stabilization related to PIVC in the pediatric context.

However, although an increase in theoretical knowledge was observed after the intervention, a gap still persists between knowledge acquisition and its practical application, especially regarding the systematic assessment of PIVC dressing.

These findings reinforce the importance of implementing continuous and multimodal educational strategies aimed at building and consolidating knowledge. Furthermore, it is essential to promote a culture of continuous learning among nursing professionals, as the ongoing improvement of their competencies is fundamental for incorporating best practices into daily care.

References

1. Kleidon TM, Schults J, Rickard CM, Ullman AJ. Techniques and technologies to improve peripheral intravenous catheter outcomes in pediatric patients: systematic review and meta-analysis. J Hosp Med. 2021;16(12):742-50. doi: 10.12788/jhm.3718.

2. Panepinto R, Harris J, Wellette J. A review of best practices related to intravenous line management for nurses. Nurs Clin North Am. 2021;56(3):389-99. doi: 10.1016/j.cnur.2021.05.001.

3. Arreguy-Sena C, Lemo RCPB, Brandão MAG, Salgueiro-Oliveira AS, Braga LM, Krempser P. Incidence and type of peripheral vascular trauma in people undergoing diagnostic imaging exams. Referência. 2020;V(2):e19061. doi: 10.12707/RIV19061.

4. Kleidon TM, Takashima M, Rickard CM, Schults JA, Bulmer AC, Ullman AJ. A prospective cohort study of technique and technology used to improve first time PICV insertion success in hospitalised paediatric patients. J Adv Nurs. 2025;81(10):6486-503. doi: 10.1111/jan.16795.

5. Zingg W, Barton A, Bitmead J, Eggimann P, Pujol M, Simon A, et al. Best practice in the use of peripheral venous catheters: a scoping review and expert consensus. Infect Prev Pract. 2023;5(2):100271. doi: 10.1016/j.infpip.2023.100271.

6. Lv L, Zhang J. The incidence and risk of infusion phlebitis with peripheral intravenous catheters: a meta-analysis. J Vasc Access. 2020;21(3):342-9. doi: 10.1177/1129729819877323.

7. Pinto KCO, Souza PR, Oliveira TC. Measures of prevention and control of infection associated with the use of venous catheter peripheral and central. Revisa [Internet]. 2021 Oct 10 [cited 2025 Mar 21];10(4):684-96. Available from: https://rdcsa.emnuvens.com.br/revista/article/view/337.

8. Nickel B, Gorski L, Kleidon T, Kyes A, DeVries M, Keogh S, et al. Infusion Therapy Standards of Practice, 9th Edition. J Infus Nurs. 2024;47(1S Suppl 1):S1-S285. doi: 10.1097/NAN.0000000000000532.

9. Charters B, Foster K, Lawton B, Lee L, Byrnes J, Mihala G, et al. Novel peripheral intravenous catheter securement for children and catheter failure reduction: a randomized clinical trial. JAMA Pediatr. 2024;178(5):437-45. doi: 10.1001/jamapediatrics.2024.0167.

10. Corley A, Marsh N, Ullman AJ, Rickard CM. Peripheral intravenous catheter securement: an integrative review of contemporary literature around medical adhesive tapes and supplementary securement products. J Clin Nurs. 2023;32(9-10):1841-57. doi: 10.1111/jocn.16237.

11. Agência Nacional de Vigilância Sanitária (ANVISA). Nota Técnica GVIMS/GGTES/DIRE3/ANVISA Nº 04/2022: Práticas seguras para a prevenção de incidentes envolvendo cateter intravenoso periférico em serviços de saúde [Internet]. Brasília (DF): ANVISA; 2017 [acesso em 2025 mar 21]. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/atencao-recem-nascido/nt4-cateter-intravenoso-anvisa-2022/.

12. Ray-Barruel G, Cooke M, Mitchell M, Chopra V, Rickard CM. Implementing the I-DECIDED clinical decision-making tool for peripheral intravenous catheter assessment and safe removal: protocol for an interrupted time-series study. BMJ Open. 2018;8(6):e021290. doi: 10.1136/bmjopen-2017-021290.

13. Ray-Barruel G, Cooke M, Chopra V, Mitchell M, Rickard CM. The I-DECIDED clinical decision-making tool for peripheral intravenous catheter assessment and safe removal: a clinimetric evaluation. BMJ Open. 2020;10(1):e035239. doi: 10.1136/bmjopen-2019-035239.

14. Ray-Barruel G, Chopra V, Fulbrook P, Lovegrove J, Mihala G, Wishart M, et al. The impact of a structured assessment and decision tool (I-DECIDED®) on improving care of peripheral intravenous catheters: a multicenter, interrupted time-series study. Int J Nurs Stud. 2023;148:104604. doi: 10.1016/j.ijnurstu.2023.104604.

15. Silva TL, Ray-Barruel G, Ullman A, Rocha PK. I-DECIDED®-Brazil: cross-cultural adaptation of an assessment and decision-making tool for peripheral intravenous catheter. Texto Contexto Enferm. 2024;33:e20230279. doi: 10.1590/1980-265X-TCE-2023-0279pt.

16. Silva TL, Ray-Barruel G, Ullman A, Takashima M, Kusahara DM, Souza S, et al. Impact of the I-DECIDED tool to improve peripheral intravenous catheter care in paediatrics: interrupted time-series study. J Adv Nurs. 2025;81(9):5329-5341. doi: 10.1111/jan.16458.

17. Jarlais DCD, Lyles C, Crepaz N; TREND Group. Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. Am J Public Health. 2004;94(3):361-6. doi: 10.2105/ajph.94.3.361.

18. Haynes AB, Haukoos JS, Dimick JB. TREND Reporting guidelines for nonrandomized/quasi-experimental study designs. JAMA Surg. 2021;156(9):879-80. doi: 10.1001/jamasurg.2021.0552.

19. Bitencourt AS, Silva TL, Souza S, Moura JWS, Santos LM, Silva BSM, et al. Effects of the TIV-Disinfect educational intervention in pediatric units: a quasi-experimental study. Rev Gaúcha Enferm. 2024;45(esp1):e20230237. doi: 10.1590/1983-1447.2024.20230237.pt.

20. Vieira NNP, Vasques CI, Reis PED, Ciol MA. Educational intervention to improve management of totally implanted vascular access device. Acta Paul Enferm. 2024;37:eAPE02872. doi: 10.37689/acta-ape/2024AO0002872.

21. Almeida ACN, Pires MH, Santana IS, Salgado PO, Toledo LV, Parreira P, et al. Effectiveness of an educational intervention for the prevention of peripheral venous catheter. Cogitare Enferm. 2022;27:e83329. doi: 10.5380/ce.v27i0.83329.

22. Bierlaire S, Danhaive O, Carkeek K, Piersigilli F. How to minimize central line-associated bloodstream infections in a neonatal intensive care unit: a quality improvement intervention based on a retrospective analysis and the adoption of an evidence-based bundle. Eur J Pediatr. 2021;180(2):449-60. doi: 10.1007/s00431-020-03844-9.

23. Indarwati F, Munday J, Keogh S. Nurse knowledge and confidence on peripheral intravenous catheter insertion and maintenance in pediatric patients: a multicentre cross-sectional study. J Pediatr Nurs. 2022;62:10-6. doi: 10.1016/j.pedn.2021.11.007.

24. Bakcek ÖA, Ayhan H. Peripheral intravenous catheter-related phlebitis and infiltration in an emergency department: a descriptive study. J Infus Nurs. 2024;47(3):155-62. doi: 10.1097/NAN.0000000000000548.

25. Singh N, Kalyan G, Kaur S, Jayashree M, Ghai S. Quality improvement initiative to reduce intravenous line-related infiltration and phlebitis incidence in pediatric emergency room. Indian J Crit Care Med. 2021;25(5):557-65. doi: 10.5005/jp-journals-10071-23818.

26. Ferreira GS, Estequi JG, Roseira CE, Souza RS, Figueiredo RM. Good practices in intravenous drugs administration. Enferm Foco. 2021;12(1):100-4. doi: 10.21675/2357-707X.2021.v12.n1.3454.

27. Zang F, Liu J, Wen Y, Jin X, Yang Y, Li L, et al. Adherence to guidelines and central-line-associated bloodstream infection occurrence during insertion and maintenance of intravascular catheters: evidence from 20 tertiary hospitals. J Hosp Infect. 2024;150:17-25. doi: 10.1016/j.jhin.2024.05.011.

28. Estequi JG, Roseira CE, Jesus JB, Figueiredo RM. Good practices in maintenance of the peripheral intravenous cateter. Enferm Foco. 2020;11(1):10-4. doi: 10.21675/2357-707X.2020.v11.n1.2246.

29. Ximenes MAM, Brandão MGSA, Araújo TM, Galindo Neto NM, Barros LM, Caetano JA. Effectiveness of educational interventions for fall prevention: a systematic review. Texto Contexto Enferm. 2021;30:e20200558. doi: 10.1590/1980-265X-TCE-2020-0558.

30. Nyarko BA, Nie H, Yin Z, Chai X, Yue L. The effect of educational interventions in managing nurses' alarm fatigue: an integrative review. J Clin Nurs. 2023;32(13-14):2985-97. doi: 10.1111/jocn.16479.

Funding/Acknowledgments: This study received support from Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, Funding Code 001, through a master's scholarship (process No. 88887.139181/2025-00). It also received financial support from the Government of the State of Santa Catarina through Fundação de Amparo à Pesquisa e Inovação do Estado de Santa Catarina. Additionally, support was provided by Conselho Nacional de Desenvolvimento Científico e Tecnológico through Call No. 09/2022 – Research Productivity Scholarships (process No. 309565/2022-7) as well as through the Public Call MCTI/CNPq No. 16/2024 – Support for International Scientific, Technological, and Innovation Research Projects (process No. 200130/2025-0).

Authorship contribution

1 – Isadora Silva de Souza
Corresponding author
Nurse – isadorasilvadesouza00@outlook.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

2 – Thiago Lopes Silva
Nurse, Doctor – thiagoslopes@outlook.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

3 – Bianka Sousa Martins Silva
Nurse, Doctor – biankabio@outlook.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

4 – Bruna Figueiredo Manzo
Nurse, Doctor – brunaamancio@yahoo.com.br
Research conception and/or development and/or manuscript writing; Review and approval of the final version

5 – Aline de Souza Bitencourt
Nurse, Master– alinesbitencourt@hotmail.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

6 – Jefferson Wildes da Silva Moura
Nurse, Doctor – jefferson.wsmoura@gmail.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

7 – Gillian Ray-Barruel
Nurse, Doctor – g.raybarruel@uq.edu.au
Research conception and/or development and/or manuscript writing; Review and approval of the final version

8 – Patrícia Kuerten Rocha
Nurse, Doctor – pkrochaucip@gmail.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

Editor in Chief: Cristiane Cardoso de Paula
Associate Editor: Rosane Cordeiro Burla de Aguiar

How to cite this article

Souza IS, Silva TL, Silva BSM, Manzo BF, Bitencourt AS, Moura JWS, Rocha PK, Ray-Barruel G. Educational intervention on peripheral intravenous catheter using I-DECIDED® on the knowledge of pediatric nursing professionals. Rev. Enferm. UFSM. 2026 [Access at: Year Month Day]; vol.16, e4:1-18. DOI: https://doi.org/10.5902/2179769293111