

CINE–PICC: SATISFACTION AND KNOWLEDGE FOLLOWING A VIDEO AND HANDS-ON TRAINING ON PERIPHERALLY INSERTED CENTRAL CATHETER

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ABSTRACT

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Introduction: This study assessed the knowledge and satisfaction of a nursing staff regarding peripherally inserted central catheter (PICC) care before and after a combined training strategy consisting of a video and hands-on practice.

Methods: A cross-sectional and prospective study with data collection held at a public university hospital from March 2018 to May 2018 and in March 2019. Participants answered a pre-test about PICC lines, watched a video on PICC care and maintenance, attended hands-on sessions, and answered a post-test.

Results: A total of 520 professionals participated in the study, of which 87.4% were from the nursing staff. The pre-test was answered by 211 individuals and the post-test questions were answered by 203 people. The satisfaction research showed 97% of satisfied respondents.

Conclusions: Our results indicate that a change from the traditional training model to an active educational approach reached more participants, representing an innovative pedagogical tool in the training of critical and reflexive professionals.

Keywords: *Catheters; In-service training; Nursing care; Team satisfaction; Vascular access device*

Introduction

In recent years, the peripherally inserted central catheter (PICC) has gained popularity over other central lines owing to advantages such as its high applicability and easiness of insertion^{1,2}. With an increasing number of indications, it is vital to weigh the risks and benefits of using PICC lines in care practices³. In this context, the maintenance and management of this device have become essential so that maximum benefit can be obtained from this technology⁴⁻⁶. Training and frequent updates in staff qualifications are goals that should be set in health institutions, not only because they transform the practice and contribute to service quality⁷, but because they could be held by applying a staff motivation strategy, for example⁷.

In order to enhance the results of educational practices and arouse the participants' interest, we highlight the importance of using innovative pedagogical strategies as a way of learning, as they not only foster pleasure and curiosity but also disseminate scientific knowledge in a dynamic and understandable way^{8,9}. Unconventional training methods have been considered as a way of achieving better results. In this perspective, methods such as "see one, do one, teach one," which may vary across different formats^{8,10}, constitute a pedagogical approach that speeds up skill acquisition.

The use of educational videos is an important motivational tool to arouse interest in a particular theme or subject and perhaps also foster related debates. In the educational process, videos encompass pedagogical, ethical, psychosocial, and political dimensions¹¹. In the health care domain, however,

this methodology is rarely used, considering that not all units can integrate interactive methods into the training of professionals, either because of a lack of knowledge or because video watching is not considered suitable to the desired theme¹².

In this context, our study was designed to test a creative, playful methodology, with the presentation of a video followed by hands-on practice conducted by PICC specialist nurses. The participants' knowledge was evaluated before and after this training modality, and satisfaction was assessed after the training.

METHODS

This is a cross-sectional and prospective study, with data collection held at a public university hospital. Data on team satisfaction and pre- and post-test results were collected from March 26 to May 20 2018 and from March 25 to March 27 2019. This training activity was submitted and approved by the institution's Research Ethics Committee under CAEE number 81745718.1000.5327. All participants were aware of data disclosure as they filled out the form.

An invitation to participate in this activity was sent by e-mail to all nursing professionals at the institution (licensed practical nurses and registered nurses). The activity was also offered to nursing academics and professors.

A video was produced by recording a realistic simulation; three-dimensional images were previously chosen for inclusion as content. The recorded scenes related to PICC manipulation included patient guidance; preparation before drug administration; disinfection of valve connectors; medication administration; pulsatile flushing of 0.9% saline or the push-pause technique; saline flushing before, between, and at the end of each medication administration (the saline flush, drug administration, saline flush [SAS] technique). In addition, the technique and materials required for PICC dressings were demonstrated. The video scenes were accompanied by a narration of all the content. The video was edited, and narrations were added by a professional video editing company, resulting in a production time of 12 minutes.

At each movie session, 40 seats were offered to licensed practical nurses, registered nurses, and nursing academics through an excel spreadsheet available at Google Drive. Our CINE-PICC edition was held for three consecutive days in alternating shifts (morning, afternoon, and night), totaling 17 sessions.

In all sessions, participants were invited to answer seven pre-test questions covering PICC care and maintenance, which were available from a link shown on the screen where the movie would be projected. The duration expected for this stage was of approximately three minutes after the link was accessed. The questions contemplated daily catheter maintenance performed by

the nursing staff. To encourage participants to participate in the post-test, the organizers offered rewards for the participants of each session on the following day, such as a certificate of 100% score in PICC care, a tape measure (to measure limb circumference [daily care] before PICC insertion), and a pen. The post-test was sent individually via e-mail to all participants the day after the session.

All participants enrolled in the CINE-PICC event were invited to attend the PICC Care and Maintenance movie screening at the institution's multimedia auditorium. Salty or sweet popcorn and soft drinks were offered in all sessions. The movie covered PICC care, from insertion to maintenance of this device in neonatal, pediatric, and adult patients.

At the end of each session, professionals were referred to one of five hands-on stations of PICC care and maintenance. Each hands-on session took around 45 minutes.

For hands-on logistics, two simulation baby mannequins, one child arm mannequin, and three adult arm mannequins were used (borrowed from the Nursing School associated with the teaching institution). Materials used for demonstrating the techniques, such as syringes, spigots, occluders, extenders, and transparent films were provided by the institution, some of which were made available for testing. The PICC catheters used in demonstrations were donated by the supplier and were expired items that would be sent for disposal.

The organization of training stations was planned by the PICC nursing team of the adult, pediatric, and neonatal care units, who adjusted the content to the specifics of each area. For setting up stations, materials were organized the day before and assembled immediately prior to the beginning of each session. In addition to the logistics for hands-on stations, the place was decorated with two balloon bows in shades of green and banners alluding to movie theater sessions. Twenty PowerPoint slides were printed on A4 paper sheets (one slide on each sheet) to ensure clarity of information so that all nurse instructors could follow the same logic and methodology during the proposed sessions.

The stations (neonatal, pediatric, and adult patients) were developed by distinguished nurses from the hospital's PICC staff. The correct dressing technique, proper blood collection, swirl techniques (pulsatile flush and start-stop flush), proper hub disinfection, and standard care such as the correct use of personal protective equipment and handwashing were reviewed in the workshops.

Eight professionals participated in each hands-on workshop so that all participants had the opportunity to perform catheter nursing care. The first station consisted of care related with neonatal patients with a PICC, the second one aimed at the care of pediatric patients, and the last three aimed at adult patient care. The neonatal station used a baby mannequin with a silicone PICC

(open tip, 1.9 Fr) for directions; the pediatric staff worked with a baby mannequin and a dummy arm to simulate care related with silicone catheters (valved tip, 3 and 4 Fr); the second and last stations of directions and care with adult patients had an arm mannequin in each of the three stations, aiming to guide professionals in adult PICC-related care, with explanations about single- and multi-lumen silicone (4 Fr, valved tip) and polyurethane (5 Fr) catheters. In all stations, customized glass bottles with a PICC submerged in water were used to simulate the effects and effectiveness of start-stop saline flushing through a PICC inside the blood vessel. Catheter types, the presence or absence of valves, stabilizer replacement, daily evaluation of the PICC limb by external and brachial circumference measurements, the reason for using 10 ml syringes for catheter maintenance, and the simulation of the effect of saline flush techniques were also reinforced.

Our variables were divided into pre-test results, post-test results, and staff satisfaction. For the pre- and post-tests, seven questions on PICC care and maintenance were elaborated according to institutional guidelines and good care practices for central venous catheters. The first question covered infection prevention measures; the second considered care with the PICC cover, fixation, and protection; the third was about daily protection during the shower; the fourth was about the care practices to avoid retraction; the fifth question was related to saline flushing (push-pause); the sixth assessed the types of syringes recommended to salinize and infuse medications; and the seventh evaluated aspects to be observed daily in PICC patients. In the following training week, all participants received a form via e-mail to evaluate the activity and methodology. A hard copy of the form was also available. The evaluation form consisted of eight questions. Three questions were related to the characterization of the participants' work activity, ie, the shifts and division of labor in the institution. Four questions were related to the methodology and dynamics used in the training, and one open-ended question was used for suggestions.

The variables concerning the characteristics of health professionals were professional category,

work shift, and division/hospital unit where they worked. CINE-PICC-related variables were: satisfaction with the training methodology using video and popcorn, satisfaction with video length, satisfaction with topics addressed in the PICC care video, and satisfaction with the dynamics of the hands-on workshops. Participants should answer each question by selecting one of three options: "Yes," "In part," or "No."

The pre-test was held immediately before the beginning of the educational activity through a form made using Google Forms. Post-test questions were sent by e-mail to all participants.

After the training, participants could fill out the evaluation instrument in one of two ways: in an online form available at Google Docs, sent by e-mail, or in the printed form, which was available in their respective work units.

Data were analyzed using SPSS v.20.0 software. Descriptive statistics were used for data presentation. Categorical variables were expressed as absolute and relative values. Pre- and post-test results were calculated with Pearson's chi-squared test. The P-value was considered statistically significant when $P < 0.05$.

RESULTS

In 2018, 464 health professionals participated in the training activity: 98% were nursing professionals, corresponding to 18.7% of the institution's nursing staff. The remaining 2% were physicians, nursing professors, and radiology technicians; 207 professionals answered the online form and 123 answered the printed form, totaling 330 respondents. In 2019, 450 professionals participated in the training activity, corresponding to 18.1% of the hospital's nursing staff. A total of 211 professionals answered the seven questions in the pre-test and 203 answered the post-test. In six of the questions, the results were above 90% in both tests; scores for the question related to dressing integrity during the shower significantly increased after the educational activity ($p = 0.005$). Table 1 shows the pre- and post-test results regarding the care of PICC.

Table 1: Pre- and post-test results regarding the care of peripherally inserted central catheter lines.

Questions	Pre-test n (%)	Post-test n (%)	*p
What are the infection prevention measures related with central venous catheters?	207 (98)	200 (98.5)	0.742
What are the care practices related with the use of transparent films?	203 (96)	193 (95)	0.571
What are the required care practices considering the catheter during the shower?	203 (96)	203 (100)	0.005
What should be observed to avoid catheter retraction?	177 (84)	172 (85)	0.814
What is the correct technique for the flushing of central venous catheters?	196 (93)	195 (96)	0.159
What is the correct syringe size to be used with PICC lines?	197 (93)	194 (96)	0.328
What should be observed on the daily assessment of patients with central venous catheters?	206 (98)	200 (98.5)	0.510

Forty seats per session were made available. Considering those who answered the satisfaction survey, we observed a greater participation of the nursing staff (51% of the survey forms were answered by licensed practical nurses, 47% by registered nurses, and the remaining 2% by physicians and other professionals).

Figure 1 shows the work shifts of the participants, indicating that the morning and afternoon shifts represented a greater share of the participation. The participants came from clinical units, surgical units (majority), and intensive care units, as well as pediatrics, neonatology, and support areas.

Figure 2 illustrates staff satisfaction with the methodology used in the training sessions. Out of 330 participants who answered the satisfaction survey, 96% liked the methodology.

Considering the suitability of the topics addressed during training, 96% of the participants reported that they were relevant to the topic of the training session (Figure 3).

The last question, illustrated in Figure 4, covered the participants' satisfaction with hands-on practice; 97% answered that they were satisfied with the displayed contents.

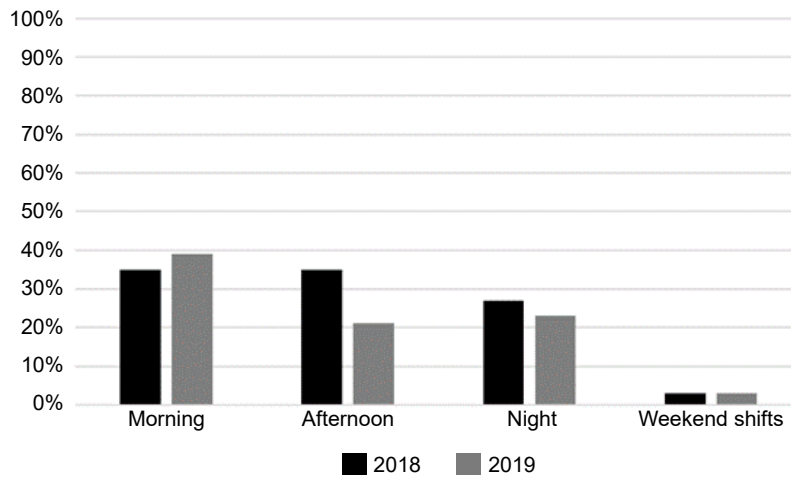


Figure 1: Work shifts of the workshop participants.

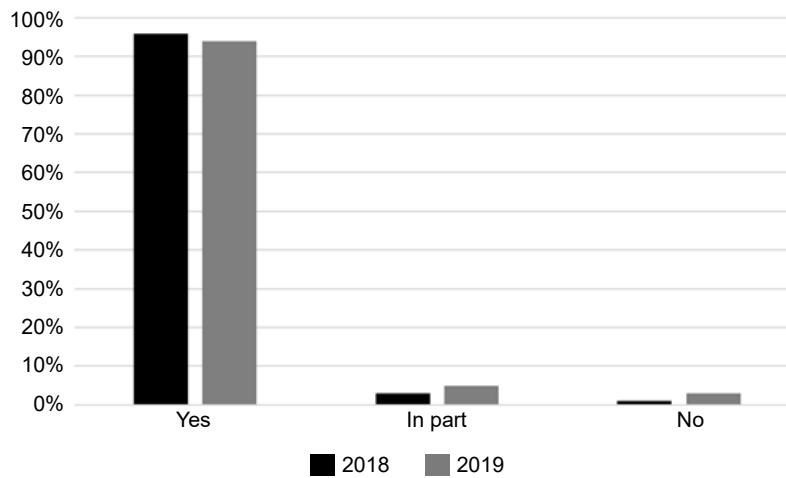


Figure 2: Staff satisfaction with the methodology.

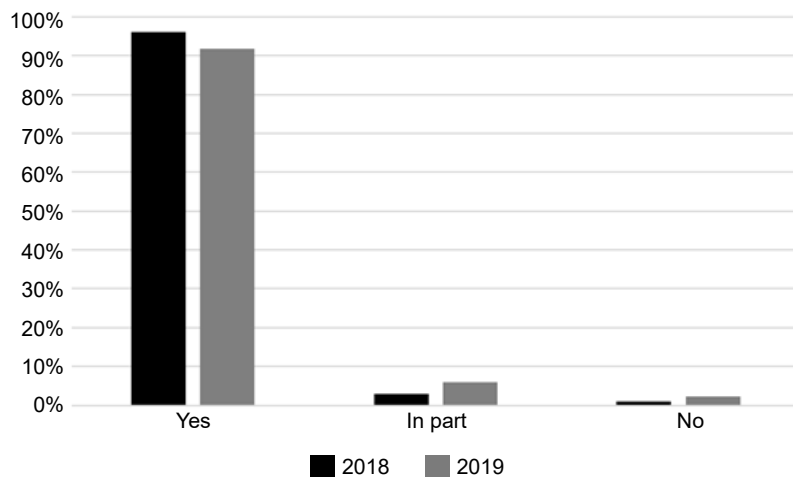


Figure 3: Relevance of the topics addressed during training.

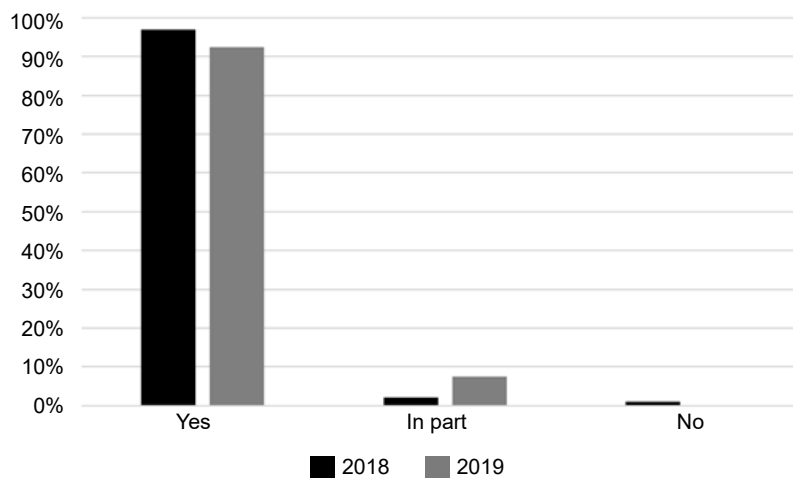


Figure 4: Participants' satisfaction with hands-on practice.

As suggestions, the participants mentioned the maintenance of this innovative educational strategy and its more frequent use throughout the year, even if for other institutional matters. They also suggested using the strategy in smaller groups, on a professional category basis, and focusing on work-specific activities.

DISCUSSION

This study brings original data on in-service training using a playful methodology, with the presentation of a video followed by hands-on practice conducted by PICC specialist nurses and the assessment of knowledge before and after training.

The pre- and post-test results showed that PICC maintenance and care practices are in agreement with the institution's quality and safety practices. We highlight that this approach increased to 100% the staff

knowledge on the daily care of dressings during the shower. In addition, participants seemed to be very satisfied with the training approach (a video followed by hands-on practice for consolidating knowledge).

The positive pre-test results are directly related with institutional data that are continuously monitored by the infection control committee, which indicate that the adherence rate to infection prevention and control measures related with central venous catheters remains above 90% in all six observed guidelines.

Authors that developed training sessions with activities where participants could interact and establish contact with the professionals and results were treated as milestones to be reached reported satisfaction and gain of knowledge during the activities¹³. They reinforce that a permanent learning opportunity is very interesting for professionals because it promotes the interpretation of roles aiming for the

quality of health care, taking into consideration the competence and performance of each professional and creating the possibility of transmitting different kinds of knowledge that involve equally different cognitive learning abilities¹⁴.

This study brings original data on the satisfaction of the nursing staff that underwent PICC training combining video and hands-on workshops. Currently, many training approaches can be used when considering health care staff. We emphasize that the results reported here suggest that using a participatory, playful, active, and attractive educational approach can more easily raise the employees' interest when compared to traditional training approaches, arousing their curiosity and willingness to participate. The interest achieved with CINE-PICC was highlighted by the participants' satisfaction.

Our results indicated that most respondents were from the nursing staff, licensed practical nurses, and nurses working in daytime shifts (morning and afternoon). They came from several areas of adult, pediatric, and neonatal care units, and a small percentage came from the institution's support areas. A significant percentage (above 95%) of the professionals were very satisfied with the methodology, video length, and questions addressed in the training.

Health care education faces constant challenges in the development of skills and competencies for care practices. The traditional ways of teaching, developed in an imposing, unattractive perspective, do not keep up with the evolution of technology and health care, nor do they favor meaningful learning⁸. In this sense, it is imperative to expand the use of active teaching-learning methodologies to qualify health care.

These training activities should be frequent because they not only provide the benefit of in-service education, but they can also raise the motivation of the nursing staff to perform the best care practices and improve adherence and content assimilation. One of the important training goals is to have a participatory attitude and behavioral change as key points. Therefore, the use of conventional training methods is related with an increased risk of difficulties

in developing a skill, eventually leading to a high variation in skill competence and a high discrepancy when validating trained professionals¹⁰.

Active methodologies create opportunities and value the context where the individual is inserted, using elements with which the health professional needs to learn and develop in everyday life at the workplace. Active methodologies, which are not traditional to learning, such as participative teaching and learning, movies, hands-on workshops, have thus been shown to be a way of broadening the professionals' participation and enhancing the quality and safety of practices for patients. Considering the adopted set of measures, they also translate into an improvement of health care quality indicators. The methodology used for this training brought total satisfaction to the staff and a motivation to learn, practice, and share the new knowledge. The expansion of this methodology to other themes can stimulate and motivate the training of many people.

The pre- and post-test results indicated that PICC maintenance and care practices were in agreement with quality and safety practices. This training strategy increased to 100% the knowledge of the health team on extremely relevant daily care practices. Our results indicate that the training strategy combining video and hands-on workshops reached a significant number of professionals; moreover, satisfaction was fully achieved by the trained staff. Further studies comparing different methodologies may contribute to the findings of this study.

Conflicts of Interest

Marcos Rodrigo Garcia and Cristiane Vizcaychipi are they clinical nurse specialists from Becton Dickinson/Brazil. For the remaining authors none were declared.

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