

PERIPHERALLY INSERTED OF CENTRAL CATHETER OF IN NEONATOLOGY: POTENTIALS AND FRAGILITIES ACCORDING TO NURSES' PERSPECTIVE¹

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ABSTRACT

Introduction: Peripherally Inserted of Central Venous Catheter (PICC) is considered a technological advance in the administration of intravenous solutions, as a new tool in Neonatology, performed by qualified nurses. **Objective:** to know the potentialities and weaknesses in the use of PICC from the point of view of nurses. **Method:** qualitative, descriptive study, carried out in two teaching hospitals in the southern region of Brazil, with 16 nurses who have already performed the insertion and maintenance of this catheter. The semi-structured interviews were conducted in April and May 2017 and the data processed through content analysis. **Results:** the participants reported potentialities regarding the use of the peripheral insertion of central venous catheter, such as duration of the device, reduction of venous punctures, greater safety in the administration of intravenous drugs, as well as some difficulties regarding the maintenance and handling of the device, the lack of professional appreciation, the resistance of colleagues towards the achievement of the technique and the need to insert this theme during graduation. **Final considerations:** it is perceived that the visibility of such a procedure, as a widely recognized competence of nurses, needs institutional support with continuous training in service and incentives and subsidies during the training of this professional.

Keywords: Nursing Care. Intensive Care Units. Peripherally Inserted Central Catheter. Neonatology.

INTRODUCTION

In neonatal intensive care units (neonatal intensive care units) newborns are admitted, from 0 to 28 days of age, with the aim of improving the different conditions, such as prematurity, metabolic, neurological, respiratory and infectious conditions⁽¹⁾.

In this logic, the increasing complexity imposed by the health needs of critically ill patients of medium and high complexity demands a restructuring of nursing care, aiming to assure safe and effective practices to health demands⁽²⁾.

Thus, intravenous therapies are considered important tools in the delivery of care. The type of catheter to be adopted will depend on the purpose of the clinical course, the durability of the treatment, as well as the purpose of the treatment. The use of the Peripherally Inserted of Central Venous Catheter (PICC) is about a durable and safe venous access technique⁽³⁾.

The PICC is a long, flexible device made of

polyurethane or silicone, with calipers between 1.9 and 3.0 F, inserted at the edge of the peripheral vein, usually in the upper or lower limbs with aseptic technique, progressing through the vein to the central system. The tip of the catheter is intended to be allocated to the superior vena cava, the mid-lower third, or the upper third. The choice of vein will be according to the vascular condition of each patient and with the assessment of the nurse or physician enabled, who will perform the technique. After insertion of the PICC, radiographic examination is recommended to confirm the positioning of the catheter⁽⁴⁾.

The PICC may remain during the time of intravenous therapy, provided that it is permeable, maintaining safety conditions to the newborn. However, adverse events resulting from the use of PICC come from the technique, from obstructions, inadequate conditions of integrity or catheter handling or from infectious processes. Thus, removal of the device is indicated in cases of phlogistic signs at the

¹Extracted from the monograph entitled "Peripherally Inserted Central Venous Catheter: Perception of Nurses in the Neonatal and Pediatric Intensive Care Unit". It was presented to Nursing School, in 2017.

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insertion site, or along the venous path. In addition, situations such as low birth weight and prematurity need to be evaluated because they are potential complications of device use⁽⁵⁾. In this context, PICC is considered a widely used care in the Neonatal ICU, added to the fact that its use is associated with a lower occurrence of morbidity and mortality, and better cost-effectiveness compared to other peripheral and central venous accesses⁽¹⁾.

In a review of randomized controlled trials in Cochrane in the Neonatal group, neonates with PICC required significantly fewer catheters/cannulas, about four to less during hospitalization (mean difference -4.3, 95% CI -5, 24, -3, 43) (6). At the Ottawa hospital in the United States of America, the median length of ICU stay was 45 days, with four cases of catheter-related bloodstream infection (0.6% [95% CI 0.17% -1, 55%]) (0.07/1000 days of catheter). The low rates of serious complications were attributed to a nurse-led specialist insertion team, standardized care and maintenance protocols, high insertion volumes, new catheter material, and ongoing quality improvement initiatives that are regularly implemented and evaluated⁽⁷⁾.

In the same country, a survey of 10 hospitals in Michigan indicated that indications for placement of the PICC were for difficult venous access from 10% to 64% ($p < 0.001$). Similarly, the frequency of PICC complications also ranged from 4.1% to 35.9%, or 0.041 to 0.406 of PICC complications in hospitals ($p < 0.001$)⁽⁸⁾. In the Brazilian literature, the literature on the PICC is scarce, including the quantitative ones that predominate in the international scenario, which indicated the benefits of PICC due to the decrease in the frequency of catheter replacement and complications with the use of this catheter.

It was noted that this practice must be anchored in standard institutional operating protocols, linked to the Nursing Assistance Systematization process (SAE)⁽⁹⁾. Thus, this study has as a guiding question: what is the view of the nurses who work or have worked in the Neonatal Intensive Care Unit on the Peripherally Inserted of Central Catheter? The objective of this research was to know the potentialities and fragilities in the use of PICC in the perspective

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METHOD

A qualitative, descriptive study was carried out in two teaching hospitals, located in a medium-sized municipality in the southern region of Brazil, being denominated as institution "A" and "B". It is worth noting that

although institution B has been a pioneer in the use of PICC in the region, it is currently institution A that uses the technique most in its work context. The view of the nurses working in the Neonatal ICUs about the PICC of two institutions is important for the knowledge about the weaknesses and potentialities found by these professionals in relation to intravenous therapy through the PICC.

The number of study participants was defined based on the total number of professionals who had the training and had experience with the insertion of the PICC in both health institutions. The inclusion criteria of the participants in the research were: to be a nurse with a training course to place the PICC and to work or have worked in a Neonatal Intensive Care Unit (ICU), developing the use of the catheter insertion and maintenance technique. Nurses on health or vacation leave, during the period of data collection, were excluded from the study. During the data collection period, eight nurses met the criteria for inclusion in institution A and nine in institution B. One professional of institution A was on health leave and was excluded from the research. Thus, 16 nurses participated in this investigation.

Data collection took place in April to May 2017, through a semi-structured interview

technique, using the voice recorder, being individually scheduled, according to nurses' availability, occurring after the presentation and signing of the Informed Consent Term, in two ways. The interview questions were about nurses' experience with PICC, facilities and difficulties with insertion and maintenance, considerations for the success of the procedure, and what was important in relation to the knowledge about the procedure.

The analysis of the data was developed from Minayo's Operational Proposal ⁽¹⁰⁾, which is characterized by two levels of interpretation, exploratory phase of the investigation, comprising the fundamental determinations of the research, and interpretative phase, in which meetings are held with the empirical facts, to identify in the participants' reports the meaning and the interpretations about the investigated topic. The ethical aspects were respected according to Resolution 466/2012, and the research was approved by the Research Ethics Committee under Opinion 1,973,467. In order to maintain the anonymity of the research participants, the interviewees were identified by the letter E, of Nurse, succeeded by the order number of the interview, and by the letters A or B, referring to the hospital institutions in which they worked.

RESULTS

Table 1. Categories of analysis.

Vision of nurses in the use of PICC	
Potentialities	Fragilities
<ul style="list-style-type: none"> • Knowledge and mastery of anatomy, physiology and pathology; • Previous experience on venous puncture; Technical ability and assessment of possible complications and/or adverse events; • Device dwell time; • Decrease as the frequency of venipuncture; • Promotes greater safety in the administration of intravenous drugs, avoiding adverse events, such as extravasation to other mentioned elements. 	<ul style="list-style-type: none"> • No preservation of venous net, through PICC for not being the first choice; • Unavailability of human resources; • Difficulties in the work process of the staff during the catheter; • Lack of material resources or their low quality for the high cost; • Some professionals' resistance, for PICC is a procedure done by nurses; • Lack of professional formation; • Absence of PICC theme in the process of academic formation of professionals; • Indefinition of the attributions of each professional involved in the catheter insertion process; • Lack of financial remuneration for the nurse performing the technique.

About the 16 nurses qualified to develop the PICC technique, the training was less than five years ago, 13 were female, with a predominant single marital status and the age group ranging from 20 to 40 years-old. Regarding training time, six of the interviewees had more than 20 years of training; two were between 10 and 20 years; and eight had time less than 10 years.

Thus, from the content analysis the following themes were built: Potentialities in the use of the Peripherally Inserted Central Venous Catheter for and Fragility in the use of the catheter. From the results, Table 1 was elaborated, synthesizing the main sense units.

Potentialities of Peripherally Inserted Central Catheter Utilization

For the insertion of the PICC, the study participants considered it is important that nurses have knowledge and mastery of anatomy, physiology and pathology. In addition, they mentioned that it is necessary to have previous experience in venipuncture, ability with the technique, as well as in the evaluation of possible complications and or adverse events caused during the procedure.

I have little experience on the PICC. [...] In order to be successful in the procedure, a good venipuncture technique is necessary, since the device is slightly more caliber than what we normally use in neonatology (E1A).

More than the purposes and advantages, you need to know the risks of complications and how to proceed with them. [...] You must know the anatomy and the patient well to identify abnormalities (E3A).

Other aspects mentioned by the participants were the advantages and benefits of PICC for the patient and nursing practice, which are: the device duration time, decrease in the submission of neonate patients to venous punctures and improvement in clinical condition in relation to time of hospitalization, considering the therapy and less damage to the newborn and child, promoting better well-being. They also pointed out that the use of PICC promoted greater safety in intravenous drug administration, avoiding adverse events, such as venous extravasations.

I think PICC's biggest facilitating agent would be its duration (E2A).

The advantage is that the child suffers less. It's been 14 days of antibiotic, sometimes the child is stuck five times a day, the access is lost. A bad child of access and I think the most important thing is to know how good it is for children (E7B).

The peripherally inserted catheter is long lasting, contributes a lot to premature babies [...] helping in the daily nursing and facilitating the administration of medications and serotherapy, avoiding drug extravasation, as occurs in the peripheral (E11B).

Given the above, it was possible to identify that, according to the study participants' view, the catheter brings benefits for the nursing staff, the newborn and the child, for promoting a culture of patient safety.

Fragilities in catheter use

The study participants reported facing numerous difficulties regarding the use of PICC in both institutions, mainly related to the lack of preservation of the venous network and the insufficiencies of professionals and materials. The nurses from both institutions indicated that PICC should be the first choice venous access, according to the clinical condition and the type of medication to be administered. Such findings can be identified in the following reports:

[...] it is necessary that the patient's venous network is intact, otherwise the puncture becomes more difficult (E1A).

[...] I was trying to puncture a child, but it is difficult. I was looking and thinking, I wouldn't have a vein for PICC [...] I wouldn't have it anymore, because it is already all burst. The child had an antibiotic treatment; it would have to be the first option to pass a PICC. If the child had PICC since the first day, that would not have happened, the child has no access, no more vein, no conditions for PICC now because we know, to pass a PICC, you need to have a good vein, thick, now there is no more (E6B).

Regarding the availability of material resources, the participants pointed out that the lack of the PICC catheter or the poor quality of the catheter makes it difficult to perform the procedure. The high cost of the catheter and the unavailability of varying sizes that are compatible with the needs of children and

neonates are shown in the following reports as implications for catheter insertion.

First you need to have the PICC catheter and it's not always that you have it in the hospital [...] it is expensive [...] before it was used intracath catheter, now the same PICC catheter is coming, but sometimes there isn't all sizes. So it is very complicated and this is a difficult agent, because sometimes there is the indication of PICC, but it does not have the catheter (E6B).

The difficulties in inserting and handling the PICC here at our institution are the quality of the material that sometimes you really see is of poor quality and not in all sizes (E13B).

Some doctors' resistance to the nurse performing the PICC procedure was another aspect mentioned by the study participants, as a limiting factor for this catheter being of first choice in intravenous therapy.

[...] The medical resistance of not wanting a central catheter punctured by a nurse, there is this prejudice (E5B).

I worked at a private institution that paid us for the course, but then we had a hard time getting started with PICC, because when we called the surgeon to do the dissection, the surgeon earned it, and we started doing PICC and suffered a medical boycott, who did not want us to pass PICC anymore. They felt as if we were taking an assignment from them, which was a profitable assignment, so we had a turbulent period that we didn't do the procedure (E15A).

The lack of continuing education processes in the nursing staff for the importance, manipulation and maintenance of the PICC and the insufficient teaching of the procedure in the professional training of nurses were mentioned by the study participants as barriers to the insertion of this catheter. As a result, obstruction events and inadequate catheter management were frequent, resulting in loss of flow and compromise of the device, jeopardizing its viability, according to the participants' statements:

I think it's an easy-to-manipulate catheter, the moment you know the care you have to take with it. But like any other catheter, I think it always facilitates continuing education. It always helps, because sometimes people fall into the same vices of the profession, and that hinders care (E5B).

PICC is an invasive procedure that may pose a risk of infection to the patient. Therefore, our technique should be as aseptic as possible for catheter puncture and installation, as well as its subsequent handling. Therefore, all nursing staff must be well trained in its handling (E1A).

If you know how to handle PICC, take care of handling, it lasts a long time, but it happens that sometimes hurry, lack of experience, use a syringe that is not suitable for PICC, breaks, bursts PICC, and also because she is very thin (E14B).

The participants' report on the financial remuneration for performing the PICC was also evident in institution B, but regardless of the institution, they reported a lack of appreciation and encouragement from hospital management to perform the PICC insertion procedure, as may be noted in the following reports:

We get nothing to pass the PICC, not even a break [...]. You simply have to leave your sector to pass PICC on a child, and sometimes it takes a long time for PICC, meanwhile your sector gets uncovered. You have to do your job and PICC without any recognition from the hospital. We have already proposed to have a bank of hours, the nurse come in reverse shift to pass the PICC, use the hours to gain off later, but nothing done, so this also makes it difficult and ends up not arousing interest in most people (E6B).

Maybe if it was well paid, if it had any incentive, then I believe it wouldn't be bad. Surely they would spend more, because we know how important it is for children, and I think that most of the time, the PICC ends up being more advantageous even for the value, we use many jelcos to puncture and ends up spending more than if the child had a PICC (E7B).

DISCUSSION

By analyzing the data, it was possible to show that the potentialities described by the interviewees are in agreement with the findings in the literature, since the PICC is becoming more widespread, especially in neonatal ICUs, being the first choice after umbilical catheterization. It is an important advance in intravenous therapy⁽¹¹⁾.

In this logic of health care, newborns admitted to the neonatal ICU are usually premature who remain for a long period of

hospitalization, presenting unstable clinical condition and requiring prolonged interventions, which is challenging for the health team. Thus, PICC has become an indispensable resource as it is considered a safe route for infusion of high osmolarity and vasoactive solutions, as it is not recommended that these types of solutions be administered via peripheral venous access, due to the risk cause infiltration and tissue necrosis by venous extravasation⁽¹²⁾. In addition, the use of PICC minimizes newborn pain, discomfort and stress, as it avoids numerous venous punctures⁽¹³⁾.

The use of PICC has been described in the literature since the mid-1970s in the countries of Europe and the United States of America to maintain long-term venous access to chemotherapy treatments and total parenteral nutrition. However, it is in the 80's that the expansion of its use is noticed, due to the practicality of insertion at the bedside. In Brazil, the PICC became widespread in the 1990s in intravenous therapy in cancer, pediatric, neonate and ICU patients, legally supported by Resolution No. 258/2001 of the Federal Nursing Council⁽¹⁴⁾.

It is noteworthy that nurses, in the hospital context, have numerous duties, such as the organization of every service, being responsible for the management of the unit, staff and care. In this scenario, the nurse is faced with the accumulation of work, added to the demotivation and the feeling of lack of professional appreciation, which can be detrimental to care work activities and the health of this worker⁽¹⁵⁾. However, universities do not properly stimulate this procedure in the academic education of nurses, and research needs to deepen the weaknesses in PICC teaching, so as to encourage reflection in training centers for the professional development of nurses, with the need for further research based on the technical and scientific basis for the use and maintenance of the PICC⁽¹⁶⁾.

On the other hand, nurses are considered a group of professionals with representativeness in the hospital and, eventually, some conflicts may arise with other health professionals, either due to structural service issues, or aspects related to care, because the nurse has expanded work space, and increasingly seeking professional

qualification and improvement⁽¹⁷⁾. Given the above, catheter insertion is an important tool used in neonatal ICU. The performance of nurses in relation to the PICC insertion technique is inextricably linked to the technical-scientific knowledge, since this technique requires professional training and qualification to perform it in a way that prioritizes patient safety, minimizing adverse events and complications arising from it. In one research, it is emphasized that one of the main reasons for not using this tool is the lack of technical-scientific knowledge⁽¹¹⁾. The PICC should not only be seen as a technique or procedure, but as a broad process by those professionals who perform its insertion and management, so that the attributions need to be about performing a clinical evaluation of the patient, the correct indication of the device and observation over the period of stay, in order to correct possible inadequacies that compromise the viability of the catheter⁽¹⁸⁾.

The relation of the high cost of PICC compared to peripheral venous access by flexible catheters, mentioned by nurses, may arise from the need for training of professionals involved in catheter insertion and maintenance, in addition to the use of inputs necessary for the procedure such as catheter, introducer, sterile fields, covers and transparent film for dressing. Thus, the use of catheter requires investment of financial and human resources, however, when compared to the Central Venous Catheter (CVC) there is a difference of values in relation to both. The unit value of the PICC material (R\$ 610.00) is higher than the CVC (R\$ 40.00), however, when comparing the cost to perform the procedure, the PICC presents a better cost benefit, on average, R\$ 320.00, due to the fact that it is performed at the bedside and does not require referral of the patient to the operating room.

The cost to perform the procedure for CVC is on average R \$ 1,700 per procedure. In sum, the investment for PICC use is 40% of the cost used for CVC⁽¹⁹⁾.

It should be noted that the issue of costs is variable, taking into account variations in locations, institutional protocols, and study period, among others. However, as this study does not aim to study the cost and investment

expended for the acquisition and insertion of the PICC, it is necessary that other studies be conducted regarding the theme.

FINAL CONSIDERATIONS

The nurses highlighted the need for PICC to be the first choice route for intravenous therapy, with a view to minimizing stress and pain to the newborn, reducing the number of venous punctures and establishing a durable and easy-to-handle access, recognizing potentialities regarding device usage as described in the results.

In the context of the weaknesses described about the use of PICC, the nurses pointed out aspects related to incorrect handling and inadequate maintenance, which may culminate

in catheter loss. Situations of material resource deficiency or poor quality were also reported. Still, the lack of support to the nurse by the managers of the institution was cited as discouraging the performance of the procedure, as well as resistance from other professional categories regarding the procedure being a nurse's assignment.

Even so, for the study participants, nurses' knowledge and qualification are not enough for the successful insertion and handling of the PICC, it is necessary to have institutional support with continuous training in service and commitment of all professionals involved in catheter handling, eligible device of first choice for long-term intravenous therapies.

CATETER VENOSO CENTRAL DE INSERÇÃO PERIFÉRICA EM NEONATOLOGIA: POTENCIALIDADES E FRAGILIDADES NA ÓTICA DE ENFERMEIROS

RESUMO

Introdução: O Cateter Venoso Central de Inserção Periférica (PICC) é considerado um avanço tecnológico na administração de soluções por via endovenosa, como uma nova ferramenta em Neonatologia, realizado por enfermeiros habilitados. **Objetivo:** conhecer as potencialidades e fragilidades na utilização do PICC a partir da ótica dos enfermeiros. **Método:** estudo qualitativo, do tipo descritivo, realizado em dois hospitais de ensino na região sul do Brasil, com 16 enfermeiros que já realizaram a inserção e manutenção desse cateter. As entrevistas semiestruturadas foram realizadas em abril e maio de 2017 e os dados tratados por intermédio da análise de conteúdo. **Resultados:** os participantes relataram potencialidades acerca do uso do cateter venoso central de inserção periférica, como tempo de duração do dispositivo, diminuição de punções venosas, maior segurança na administração de medicamentos intravenosos, assim como algumas dificuldades em relação à manutenção e manuseio do dispositivo, a falta de valorização profissional, a resistência por parte de colegas frente à realização da técnica e a necessidade de inserção desta temática durante a graduação. **Considerações finais:** percebe-se que a visibilidade de tal procedimento, enquanto competência amplamente reconhecida do enfermeiro precisa de apoio institucional com capacitação continuada em serviço e de incentivo e subsídios durante a formação deste profissional.

Palavras-chave: Cuidados de enfermagem. Unidades de Terapia Intensiva. Cateter Venoso Central de Inserção Periférica. Neonatologia.

CATÉTER VENOSO CENTRAL DE INSERCIÓN PERIFÉRICA EN NEONATOLOGÍA: POTENCIALIDADES Y FRAGILIDADES EN LA PERSPECTIVA DE ENFERMEROS

RESUMEN

Introducción: El Catéter Venoso Central de Inserción Periférica (PICC) es considerado un avance tecnológico en la administración de soluciones por vía intravenosa, como una nueva herramienta en Neonatología, realizado por enfermeros habilitados. **Objetivo:** conocer las potencialidades y fragilidades en la utilización del PICC a partir de la perspectiva de los enfermeros. **Método:** estudio cualitativo, del tipo descriptivo, realizado en dos hospitales de enseñanza en la región sur de Brasil, con 16 enfermeros que ya realizaron la inserción y el mantenimiento de este catéter. Las entrevistas semiestructuradas fueron realizadas en abril y mayo de 2017 y los datos tratados por intermedio del análisis de contenido. **Resultados:** los participantes relataron potencialidades acerca del uso del catéter venoso central de inserción periférica, como tiempo de duración del dispositivo, disminución de venopunción, mayor seguridad en la administración de fármacos intravenosos, así como algunas dificultades respecto al mantenimiento y manejo del dispositivo, la falta de valoración profesional, la resistencia por parte de colegas frente a la realización de la técnica y la necesidad de inclusión de esta temática durante el pregrado. **Consideraciones finales:** se percibe que la visibilidad de tal proceso, como competencia ampliamente reconocida del enfermero, necesita de apoyo institucional con capacitación continuada en servicio y de fomentos y subvenciones durante la formación de este profesional.

Palabras clave: Atención de Enfermería. Unidades de Cuidados Intensivos. Catéter Central de Inserción Periférica. Neonatología.

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Submitted: 13/04/2019

Accepted: 15/07/2019