

## Peripherally inserted central catheter (PICC): nursing knowledge in neonatal intensive care unit

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**Abstract:** The peripherally inserted central catheter (PICC) has been used as an alternative of safe and effective venous access for Critically Ill NCs, with a technological repress indispensable to the care of these patients. The stucco aims to describe nursing knowledge in patients with peripherally inserted central catheter (PICC) in a Neonatal Intensive Care Unit (NICU). This is a descriptive, exploratory field study with quantitative approach. The study was carried out in a NICU in a public hospital in the municipality of Vitória de Santo Antão - PE. A questionnaire with objective questions was used to collect the data of nursing

professionals to obtain knowledge pertinent to the procedure and nursing care in question. The sample consisted of nurses and nursing technicians, totaling a sample of 49 professionals, where 30.62% (n=15) were nurses and 69.38% (n=34) were nursing technicians. Of this quantitative 10.2% (n=5) were away for vacation, being 4.08% (n=2) nurse and 6.12% (n=3) nursing technicians, which characterizes them to be excluded from the research, in addition, 2.04% (n=1) of the professionals refused to participate in the research. Studies demonstrate the importance of their knowledge for the insertion and maintenance of these devices. The possession of information brings to the professional's greater confidence to the procedures executed. It is perceived through this study that it is necessary to disseminate knowledge by improving qualification courses, basing nursing actions and care.

**Keywords:** Newborn. Intravenous therapy. Peripheral catheterization

## 1. Introduction

The neonatal period corresponds from birth to the first 28 days of life, and can be understood as a moment of great vulnerability in the life of newborns (Newborns), with a view to biological, environmental, socio-and-cultural risks (LIMA; AVILA; NEVES, 2015).

The Neonatal Intensive Care Unit (NICU) consists of a place of favorable therapeutic practices, with interventions and treatments for patients in severe condition. The NICU corresponds to a hospital space with technological advances and devices for monitoring these patients, it is a sector responsible for promoting survival conditions and reversing problems that may endanger the lives of these NCs with the performance of complex and invasive care (TRINDADE; ANGELS, 2016).

Composed of technical routines, the NICU requires from professionals' skills, knowledge and dexterity in the way of facing emotional and difficult moments, participating in development and an effective increase in the survival of NCs (TRINDADE; ANGELS, 2016).

The main occurrences for hospitalizations in NICU are: Extreme premature newborns, respiratory disorders, meconium aspiration, so for improvements in these occurrences it is necessary to have a well-performed prenatal care, giving better birth conditions to these children always paying tribute to any aggravation that may exist (LIMA; AVILA; NEVES, 2015).

The premature newborns of low weight and those with lower gestational age, are more susceptible to complications caused by prematurity, the immaturity of these systems and organs allow these Newborns to be exposed to infections, having to enter with antibiotic regimens and use of parenteral nutrition (NPT) makes necessary a safe access for infusion of these therapeutic supports (SILVA *et al.* 2016).

It is the responsibility of the nursing professional to make progress in adapting the NB to the environment in which he is exposed. It is necessary that nurses communicate to parents and guardians the procedure they will perform, always enabling favorable improvements, to maintain metabolic performance, monitoring infection, instigating the NB and instructing their families (MONTEIRO; VIANA; BATISTA, 2015).

The complications of respiratory disorders are more frequent due to immaturity of the pulmonary system.

Complications affect the CNS and generate several health problems of neonates who need invasive procedures, central catheter insertion, use of mechanical ventilation and hemodynamic monitoring (OLIVEIRA *et al.* 2015).

The peripherally inserted central catheter (PICC) is an alternative of central venous access profusely used in NB hospitalized in a NICU, refers to a long and flexible device inserted through a peripheral vein by percutaneous puncture continuing to the distal middle third of the superior vena cava, with non-pharmacological mediation for analgesia, lumen consisting of polyurethane or silicone. The use of PICC limits the exposure of newborns to pain to stress, reducing discomfort by numerous punctures (TRINDADE *et al.* 2016).

PICC is considered a widely used device in neonates hospitalized in a NICU. It refers to a catheter that has the possibility of being inserted at the bedside, using aseptic techniques, by a nurse as long as he/she has knowledge for insertion and handling of the bed. The catheter is indicated for long-term therapy infusion and for continuous and intermittent use solutions. However, there is a high risk of some complications, such as thrombosis, phlebitis, extravasation obstruction and rupture and bloodstream infections (COSTA *et al.* 2016).

Siqueira e Souza (2017) shows that the population of NUs submitted to PICC insertion are mostly composed of low-weight preterm that require this device to ensure its growth and development, since the organs related to sucking and nutrition are not yet fully developed. Faced with the urgency of administrations of solutions and medicines, zeal with PICC is the precaution of reliable venous access for hospitalized newborns, and nursing professionals need theoretical and practical training in the face of increasing technological advances.

The nurse is protected by the Federal Nursing Council (COFEN) for the handling of the insertion and manipulation of PICC, and based in Brazil by Resolution No. 258/2001, Articles 1 and 2. Nursing follow-up should give priority to prevention and early identification of complications when referring to catheter use, with a view to the safety of the neonate (COFEN, 2001).

The nursing team is of great importance in care, whatever the function with the commitment with regard to the performance and provision of care to the patient. Thus, the assistance to these NUs in the NICU is redoubled taking into account the critical state. Where there is a constant risk of

death, and several complications such as infections and others (SOUSA *et al.* 2016).

The aim of this research is to describe nursing knowledge in patients with Peripherally Inserted Central Catheter (PICC) in a Neonatal Intensive Care Unit (NICU).

## 2. Methodology

This is a descriptive study with a cross-sectional quantitative approach. According to Costa and Barreto (2003), descriptive studies aim to determine health-related conditions, based on time, place or characteristics of the individual. Based on the studies by Turato (2005), the qualitative approach has greater strength in the vigor of the validity of the collected data, since the observation because it is accurate, and its listening in interview, tend to bring the researcher very close to the essence of the question under study.

According to Bordalo (2006), the cross-sectional research may be of incidence or prevalence, where the former aims to investigate a given disease or health conditions in a given group of new cases, it oscillates over time and in different spaces.

A structured questionnaire with objective questions was used to collect the data of nursing professionals to obtain knowledge relevant to the procedure and nursing care in question. The instrument used in question started in April 2019, ending in May 2019. This questionnaire was developed by the researcher, but adapting from another, using as a base the published and validated of COSTA and LIMA (2015).

The research population consisted of nursing professionals working in the Neonatal Intensive Care Unit of João Murilo de Oliveira Hospital in the municipality of Vitória de Santo Antão - PE. For the study sample, nursing professionals who met the following criteria were interviewed:

a) Inclusion: Have a link with the institution (public servant or contracted, state or outsourced); To agree to participate in the research by signing the Free and Informed Consent Form (TCLE).

b) Exclusion: Not to be in office during the period collection of data by vacation or License of any kind; To be performing only administrative function in the sector.

For data analysis was built a Database in Microsoft Excel 2007 with the variables included in the study. For the analysis of these data, measures of central tendency (mean) and variability (standard deviation) were used to observe the dispersion between the collected variables, distributed in their absolute and relative frequencies and analyzed by simple percentage.

The present research was submitted to the ethical analysis of the Ethics and Research Committee of the Integrated Colleges of Vitória de Santo Antão and approved on March 29, 2019, under opinion number 3,232,502 and CAAE no. 08333219.5.0000.9227.

## 3. Results and Discussion

The sample used for the due research consisted of nurses

and nursing technicians, totaling a sample of 49 professionals, where 30.62% (n=15) were nurses and 69.38% (n=34) were nursing technicians. Of this quantitative 10.2% (n=5) were away for vacation, being 4.08% (n=2) nurse and 6.12% (n=3) nursing technicians, which characterizes them to be excluded from the study, according to exclusion criteria, in addition, 2.04% (n=1) of the professionals refused to participate in the research.

Thus, the current research included 43 (100%) professionals, 30.23% (n=13) nurses and 69.77% (n=30) nursing technicians.

Regarding the time of experience of the interviewed professionals, it was found that predominantly professionals have between 4 and 7 years of experience in the area, verifying 58.13% (n=25). Of these, it is noteworthy that the majority of 37.20% (n= 16) have 6 years of experience in the area, a fact that is justified by the time of existence of the analyzed sector, which is also 6 years.

**Table 1.** Time of professional experience in the field of neonatology

	NA SAMPLE	PERCENTAGE (%)
< 1 year	03	6,98%
1 - 3 years	13	30,23%
4 - 7 years	25	58,13%
8 - 10 years	01	2,33%
> 10 years	01	2,33%
<b>TOTAL</b>	43	100%

Source : Authors based on research data

Regarding the professionals evaluated, it was verified that only 69.23% of the nurses have specialization in the area where 30.77% do not have specialization and this factor is directly associated with the increased ability to understand the procedure of the theme in question, considering that the higher the level of education of the professional, the higher the level of knowledge of this acquired.

analyzing the period of permanence and performance in the institutions are of great relevance because the longer the time in the work unit, but information added to their professional experience, uniting greater practical and theoretical knowledge improving the care provided to these patients (DIAS, 2015).

**Table 2.** Training of nurses in a hospital in the interior of Pernambuco on the theme

	YES		NO		TOTAL	
	N	%	N	%	N	%
<b>Professionals who took PICC course</b>	12	92,30%	01	7,70%	13%	100%
<b>Professionals who had a course offered by the</b>	03	23,08%	10	76,92%	13%	100%

**institution**

Source : Authors based on research data

Regarding the theme about the training of professionals to insert the catheter, 92.03% of the nurses interviewed (n=12) took a PICC course, however, are able to perform the catheter insertion, only 7.70% (n=1) do not have the aptitude to perform the PICC insertion. When measuring this question, it is noted that 23.08% (n=03) had the course offered by the institution, emphasizing that 76.92% (n=10) took the course on their own.

The nursing professionals who took the PICC course have more dexterity in evaluating the questions on the subject, show better results with regard to the catheter, when compared to professionals who have never taken the course (DIAS, 2015).

**Table 3.** Training of nursing professionals about the peripheral insertion central catheter

	CORRECT		INCORRECT		TOTAL	
	N	%	N	%	N	%
Concept	38	88,37%	5	11,63%	43	100%
Goal	40	93,02%	3	6,98%	43	100%
Advantages	41	95,34%	2	4,66%	43	100%
Contraindication	43	100%	00	0%	43	100%
Indications	41	95,34%	2	4,66%	43	100%

Source : Authors based on research data

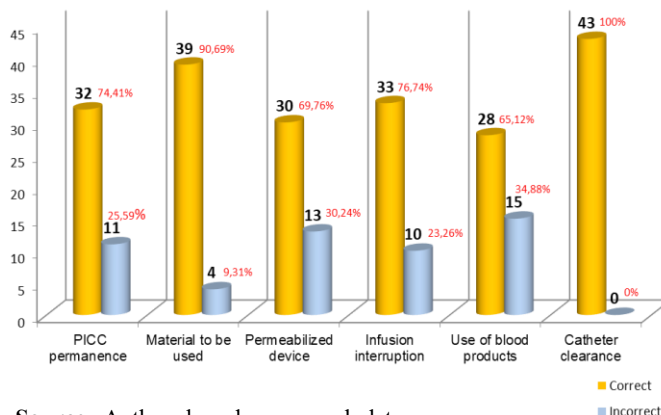
When analyzing the answers provided by the professionals regarding their knowledge about the theme, we observed the number of correct and incorrect answers, where it was noticed that 88.37% (n= 38) know what PICC is and 11.63% (n=5) do not, for incorrectly answering the questionnaire. 93.02% (n= 40) knows the importance of PICC to be inserted, 6.98%(n=3) do not know the importance of PICC, in addition 95.34% (n= 41) recognize the catheter wants for the NCs, however 4.66% (n=2) of the interviewees answered advantages of PICC (Table 3).

As shown in table 3, 100% (n= 43) of the interviewed professionals denote the knowledge in relation to the contraindications of what is inserted in this type of device, and this question reached totality of success. In relation the indications for the insertion of PICC, 95.34% (n=41) of nursing professionals are aware of the recommended, but 4.66% (n=2) do not have adequate guidance.

Studies demonstrate the importance of nursing professionals' knowledge for the insertion and maintenance of these devices in the NICU. Related to the knowledge of professionals about the catheter, it becomes clear that they denote important practical and specific knowledge, it is believed that when they act in a aware and safe way, possible errors in the care provided to patients are avoided. The possession of information brings to professionals' greater respectability and trust to the complex procedures performed (VERA; SOUSA, THE SOUSA ARAÚJO, 2015).

**Figure 1.** Parents of professionals of a hospital in the interior

of Pernambuco about performing the technique and handling the Catheter.



Source : Authors based on research data

When analyzing the interviewees' knowledge about the performance of the technique and handling the device, 74.41% (n= 32) recognize the length of stay of the PICC, however, 25.59% (n=11) do not know the length of stay of the device. Regarding the material to be used, 90.69% (n=39) distinguishes the type of syringe to be used in the catheter, however 9.31% (n= 04) and the same nursing technicians do not recognize the type of material to be used.

When asked by the professionals, it was evidenced that 69.76% (n=30) are aware that this catheter can be permeabilized, but 30.24% (n=13) does not differ the same, to answer wrong in the questionnaire (Grafico1).

As shown in graph 1 In the variable when asked if when changing a venoclisetherapy can stop an infusion 76.74% (n=33) is aware of the interruption of the infusion, therefore 23.26% (n=10) do not know how much the infusion interruption.

When it comes to the use of blood products in the catheter, 34.88% (n=15) reported that any blood product yipo can be administered. However, 65.12% (n=28) reported that no blood products should be used in the device. When the interviewees were asked about 100% PICC clearance (n=43) they were aware of what can be used for catheter clearance.

Knowledge of professionals about the technique and catheter handling, to reduce the risks with the devices and to avoid early removal, nurses need to train their technical team, and highlight the importance of the catheter for the N.C. To emphasize that failure in handling will result in major complications for the patient. However, it is of paramount importance that these trainings be carried out at least once a year, due to the great technological advances and findings through PICC practices (SILVA; CONCEPTION; MOREIRA, 2018).

According to the literature, obstruction is necessary 0.9% before and after each medication to be administered, and every six hours thus ensuring catheter permeability and always recommended a continuous venoclysis to ensure positions pressure to decrease the return of blood to the catheter lumen. This care is very effective to avoid obstruction of the device

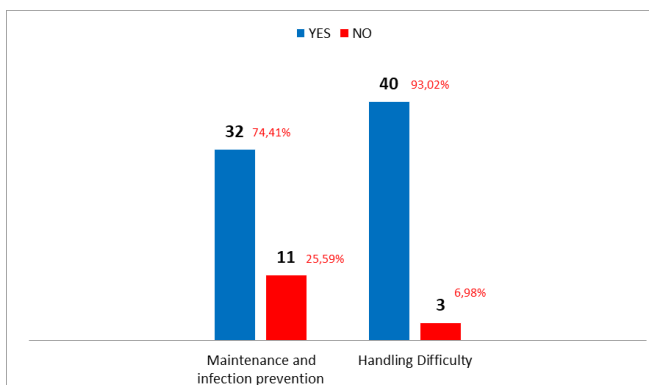
(LUI *et al.* 2018).

Given the current literature, the use of blood products and blood collections is not recommended because there is the possibility of catheter obstruction because they demonstrate frailty for these purposes (LUI *et al.* 2018).

Utilized syringes are very important, because the uncorrected use of the syringe can cause catheter rupture. It is forbidden to use syringes with volumes smaller than 10 ml, because the lower the volume, the greater the pressure exerted on the device, causing lumen disruption (LUI *et al.* 2018).

PICC is a long-term central venous catheter with indication for drug therapy above six days, however its duration is not yet defined, the insertion site should be evaluated daily for any signs of infection (RANGEL *et al.* 2019).

**Figure 2.** Factors that influence the practice of nursing professionals on PICC



Source : Authors based on research data

When analyzing the variables about the factors that influence the practice of the nursing team about PICC, it denotes that 74.41% (n=32) are aware of the maintenance and prevention of infection, with 25.59% (n=11) not referring to the correct technique in terms of maintenance and prevention of catheter infection. In the study cited, it was observed in the last variable that 93.02% (n=40) reported no difficulty in handling with PICC, but 6.98% (n=3) say they have difficulty handling this type of device. Among the difficulties mentioned by the professionals is the lack of training for the professionals and their lack of interest in performing the correct technique.

It is important to emphasize the importance of hand washing for the prevention of infection, in this context it is highlighted the manipulation of the catheter be preceded by hand hygiene and disinfection of the connections, washing should be preceded with soap and water in the presence of dirt or body fluids but when it is not visibly dirty alcohol solution can be applied from 60 to 80%, disinfection of the connections is performed with alcoholic solutions with frictions of 5 to 15 seconds (LUI *et al.* 2018).

#### 4. Conclusions

It is essential that professionals have scientific and

technical knowledge, to perform the technique and handle the catheter, to reduce the risks with the device and to avoid the removal of precocial, then nurses need to train and show their technical team the importance of the catheter for the NCs, and that failure in handling will result in major complications for it. Therefore, it is importing that trainings be carried out at least once a year, due to the great technological advances and findings through the practice of PICC.

It is perceived through this study that it is necessary to disseminate the scientific knowledge of nursing, in this theme being offered subsidies that favor the development of this practice in the area of teaching improving the qualification courses, basing the actions and nursing care.

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