MEASURING THE PAIN IN NEWBORN INFANTS DURING PERIPHERAL AND CAPILLARY VENOUS PUNCTURE

DIMENSIONAMIENTO DEL DOLOR EN RECIÉN NACIDOS DURANTE PUNCIÓN VENOSA PERIFÉRICA E CAPILAR

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ABSTRACT

Objective: to measure the pain of newborn infants who underwent venous puncture and identify nursing care. Method: this is a quantitative, cross-sectional, and observational study carried out in a Neonatal Intensive Care Unit of a public hospital in Fortaleza, Ceará, Brazil, with 110 newborn infants and 110 nursing professionals. A form and the Neonatal Infant Pain Scale (NIPS) were used. The data were organized in the Microsoft Excel software and presented in tables. The research was approved by the Research Ethics Committee of Faculdade Metropolitana da Grande Fortaleza, under the Protocol 070/2010. Results: 91% of nurses and 3% of nursing technicians used non-pharmacological measures to relieve the neonatal pain. The most used non-pharmacological measure was glucose by 25% (88.6%). Through NIPS, it was noticed that 57.1% of newborn infants felt pain during the peripheral venous puncture and 24% during the capillary venous puncture. Conclusion: the nursing professionals identified the pain in newborn infants, however, there was not completeness in the use of non-pharmacological measures for reducing the neonatal pain. Descriptors: pain; newborn infant; neonatal nursing.

RESUMO


Résumé

Objetif: mesurer la douleur chez les nouveau-nés soumis à une ponction veineuse et identifier la soin des soins infirmiers. Méthode: il s'agit d'un étude quantitatif, transversal et observatoire effectué dans un Centre de soins intensifs néonatals d'un hôpital public de Fortaleza, Ceará, Brésil, avec 110 nouveau-nés et 110 professionnels d'infirmières. On a utilisé un formulaire et la Scala douloureuse néonatale (NIPS). Les données ont été organisées avec l'aide de Microsoft Excel et présentées en tableaux. La recherche a été approuvée par le Comité d'éthique en recherche de la Faculdade Metropolitana da Grande Fortaleza, en vertu du protocole 070/2010. Résultats: 91% des infirmières et 3% des techniciens d'infirmières ont utilisé des mesures non pharmacologiques pour apaiser la douleur néonatale. L'écart de la mesure non pharmacologique la plus utilisée a été le glucose à 25% (88,6%). A travers la NIPS, on a observé que 57,1% des nouveau-nés ont ressenti la douleur pendant la ponction veineuse périphérique et 24% pendant la ponction veineuse capillaire. Conclusion: les professionnels des soins infirmiers ont identifié la douleur chez les nouveau-nés, cependant, il n'y a pas completé dans l'utilisation de mesures non pharmacologiques pour réduire la douleur néonatale. Descriptors: douleur; nouveau-né; soins infirmiers néonatals.
INTRODUCTION

The number of newborns (NB) in Neonatal Intensive Care Units (NICU) is constant.¹ To maintain the survival of newborns, it is necessary providing a routine healthcare, such as laboratory examinations, with blood samples for arterial blood gas, peripheral venipuncture, capillary puncture, complete blood count, C-reactive protein, blood typing, Rh factor, urea, creatinine, electrolytes, bilirubin, glucose, and urinary density.²

The invasive procedures of peripheral venipuncture and capillary puncture, in spite of being necessary and frequent in NICU, cause pain in newborns. Pain is a subjective, sensitive and, emotionally, unpleasant experience, associated with actual tissue injury, potential or described.³

For years, health professionals were reluctant to consider pain as a relevant feature in newborns, because they believed that due to the young age and the impaired development, this sensation would not be so present and, therefore, would not affect their staying in the NICU. This fact, after researches, was proven as erroneous and without practical application.⁴

Today, it is known that although the RN does not have the ability to verbally express the painful sensation, it is able to nonverbally communicate itself,⁵ by the change in the heart rate, changes in oxygen saturation, movement of arms and legs, facial expression of pain, squeezed eyes and nasolabial groove.⁶

During the period of internment in NICU, NB experience several painful sensations. In the first week of life, they are subjected to an average of 50-150 potentially painful procedures, throughout the internment period, when he has less than 1.000 grams; the numbers of painful procedures reach approximately 500 over the hospitalization period.⁷

The Nursing in the neonatal unit provides care and performs painful and necessary procedures for the discharge of the newborns. That is why, it is important the presence of nursing professionals with expertise in sizing the neonatal pain, aiming at measuring and relieving harmful effects, making necessary the use of scales, among them the Premature Infant Pain Profile (PIPP) and the Neonatal Infant Pain Scale (NIPS).⁸

Hence, based on the practice in Neonatal Nursing and concern about the qualifications of the professional in sizing of the neonatal pain, we questioned: do nursing professionals know sizing neonatal pain?

The answers to this question can drive other studies with regard to the neonatal pain. Furthermore, it is important researching about this theme, so that the Nursing performs the sizing of the neonatal pain accurately, which could contribute, actually, to the practice of the care for the newborns.

Therefore, this study has like objectives to size the pain of newborns submitted to venipuncture and identifying the nursing care.

METHOD

It is a quantitative, cross-sectional and observational study, which was developed in a NICU from a public hospital in the city of Fortaleza/CE, Brazil, from January to March 2012.

The research sample consisted of 110 newborns and 110 nursing professionals who were working in the NICU. The inclusion criteria for the newborns were: being submitted to peripheral venipuncture or capillary puncture, regardless of gestational age or medical diagnosis. For nurses, it was necessary that they were working in the NICU for over a year and were on duty at the time of data collection.

To obtain the data, we used a form with identification data, non-pharmacological measures and pain assessment scale based on the NIPS, for identification of pain intensity. The NIPS is an instrument comprised of six indicators of pain, five behavioral and one physiological, including facial expression, crying, movement of arms and legs, sleep state / alert and breathing pattern. The scores are 0, 1, and 2 points; each indicator has features regarding each scoring. The minimum scoring is zero and the maximum is 7; it should be characterized the pain if the sum is greater than or equal to 4.⁹

The recording of physiological and behavioral parameters occurred during the painful procedure. The obtained data were organized into a database of the Excel program and related to the objectives of this survey, subsequently, they were organized in tables, with absolute frequency and percentage, average and standard deviation. The answers were grouped into similar categories, treated according to absolute indexes and percentages and presented in a descriptive way and tables, being supported by the literature concerning the theme.

The research was conducted in accordance with the Resolution 196/96, from the Brazilian National Health Council / Ministry of Health.
which discusses on research involving human beings, after approval by the Ethics Research Committee, as Protocol nº 070/2010.

**RESULTS**

Of the 110 nursing professionals who were participants in this survey, 44 were nurses and 66 nursing technicians, all of them were female. With regard to the work time in Neonatology, the average was two years. With respect to courses in the Neonatology field, the study participants had at least one 40-hour course in this field.

Regarding the characterization of the NB who were hospitalized in the NICU, 62.7% (69) were male and 37.3% (41) were female, 81.8% (90) sorted in preterm and 18.2% (20) in term; as for the way of delivery, 66.4% (73) was cesarean section and 33.6% (37) was natural. Birth weight ranged between 500g and 3.500g with an average of 2.206 g. We found NB with maximum gestational age of 38 weeks and minimum of 26 weeks, with an average of 34.4 weeks. The most common medical diagnoses were Respiratory Distress Syndrome (RDS) and prematurity.

The pharmacological and non-pharmacological measures performed by nursing professionals during the painful procedure are shown in the Table 1.

Table 1. Use of pharmacological and non-pharmacological measures performed by nurses and nursing technicians, during the painful procedure of peripheral venipuncture and capillary puncture. Fortaleza, CE, Brazil, 2012

<table>
<thead>
<tr>
<th>Variables</th>
<th>Nurses (n=44)</th>
<th>Nursing Technicians (n=66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of pharmacological measures</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Yes</td>
<td>11 (25)</td>
<td>-</td>
</tr>
<tr>
<td>No</td>
<td>33 (75)</td>
<td>66 (100)</td>
</tr>
<tr>
<td>Use of non-pharmacological measures</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Yes</td>
<td>40 (91)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>No</td>
<td>4 (9)</td>
<td>64 (97)</td>
</tr>
<tr>
<td>Pharmacological measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>11 (25)</td>
<td>-</td>
</tr>
<tr>
<td>Non-pharmacological measures</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Glucose in 25%</td>
<td>39 (88,6)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Glucose in 25% and cosiness</td>
<td>3 (6,8)</td>
<td>-</td>
</tr>
<tr>
<td>Glucose in 25%e and therapeutic touch</td>
<td>1 (2,3)</td>
<td>-</td>
</tr>
<tr>
<td>Massage</td>
<td>1 (2,3)</td>
<td>-</td>
</tr>
</tbody>
</table>

The distribution of variables of pain in NB who were submitted to peripheral venipuncture and capillary puncture is presented in the Table 2.

Table 2. Distribution of parameters of the NIPS scale, in newborns, during peripheral venipuncture and capillary puncture. Fortaleza, CE, Brazil, 2012.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Assessment of pain occurrence</th>
<th>Does not feel pain</th>
<th>Feels pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PV (n=24)</td>
<td>CP (n=41)</td>
<td>PV (n=32)</td>
</tr>
<tr>
<td>Facial expression</td>
<td>Relaxed</td>
<td>20 (83,3)</td>
<td>34 (83)</td>
</tr>
<tr>
<td></td>
<td>Contracted</td>
<td>04 (16,7)</td>
<td>07 (17)</td>
</tr>
<tr>
<td>Crying</td>
<td>Grumbling</td>
<td>00 (00)</td>
<td>8 (19,5)</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>24 (100)</td>
<td>33 (80,5)</td>
</tr>
<tr>
<td>Legs</td>
<td>Relaxed</td>
<td>24 (100)</td>
<td>24 (58,5)</td>
</tr>
<tr>
<td></td>
<td>Lowered/Extended</td>
<td>00 (00)</td>
<td>17 (41,5)</td>
</tr>
<tr>
<td>Arms</td>
<td>Relaxed</td>
<td>21 (87,5)</td>
<td>31 (75,6)</td>
</tr>
<tr>
<td></td>
<td>Lowered/Extended</td>
<td>03 (12,5)</td>
<td>10 (24,3)</td>
</tr>
<tr>
<td></td>
<td>Sleeping</td>
<td>23 (95,8)</td>
<td>38 (92,7)</td>
</tr>
<tr>
<td></td>
<td>Uncomfortable</td>
<td>1 (4,2)</td>
<td>3 (7,3)</td>
</tr>
<tr>
<td></td>
<td>Breathing</td>
<td>24 (100)</td>
<td>41 (100)</td>
</tr>
<tr>
<td></td>
<td>Changed</td>
<td>00 (00)</td>
<td>00 (00)</td>
</tr>
</tbody>
</table>

The total scoring of pain scores according to the NIPS scale in NB who were submitted to painful procedures is listed in the Table 3.
The study on the pain in NB has awakened the interest, both of professionals in everyday clinical practice and researchers in academia. The frequent and prolonged painful stimuli are harmful to the developing of nervous system of NB and threaten the physiological stability of premature patients, resulting in permanent changes in the immature brain and its pain system.9

The existence of pain in NB is proven by the physiological development of the infant, in which the transmission of pain is present during fetal life and in the first months of life, whose nociceptive nerve endings of RN aged 20 weeks of gestation is equal to or greater than that of an adult.10 Significant repercussions on brain development of neonates are caused by pain, causing physiological instability and behavioral disorganization, often perceived in the childhood.11

Among the numerous procedures involving the hospitalization of NB in the NICU, the peripheral venipuncture1 and capillary puncture are the most performed because of the need for monitoring of examinations and medication administration. In this study, capillary puncture occurred in a greater number of times than the peripheral venipuncture. In the case of researched newborns, venipuncture was performed for administration of medications or laboratory examinations and capillary puncture for laboratory tests.

The pain triggered by these painful procedures has been target of growing concern of the healthcare team, especially for nursing professionals who frequently perform these procedures in NB.12

In the context of the nursing care, it should be highlighted the non-pharmacological measures for pain relief. These measures of caution are considered non-invasive techniques that prevent or reduce the intensity of the painful process in several procedures, such as during the peripheral venipuncture and capillary puncture.13

It should be realized, clearly, in this study, the concern of the researched nurses in administering pharmacological or non-pharmacological measures for the pain relief of the newborn, which was not seen in a greater numbers with the nursing technicians. Regarding the used pharmacological measures, we met the fentanyl citrate, analgesic medication used in NICU environment, which is administered according to the medical prescription and clinical need of NB. The use of this medication occurs due to the respiratory adverse effects arising from the continuous infusion of opioids and absence of long-term benefits.12

With regard to the non-pharmacological measures used by nursing professionals in NB with pain, the glucose in 25% was the measure of first choice, concomitant with the cosiness and therapeutic touch. The glucose in 25% is effective for the pain relief.13-14

The pain assessment in the neonatal period is based on the modification of physiological or behavioral parameters, which can be observed before or after a painful stimulus.15 The scale is a type of instrument that proves the presence or absence of pain in NB. These tools facilitate interaction and communication of nursing professionals, who start to see and perceive the evolution of the pain in neonates and verify the answers before the employed therapy.16

With regard to the distribution of NIPS scale for the assessment of pain occurrence in NB, there was a higher prevalence of relaxed facial expression (83.3%) for NB submitted to peripheral venipuncture and capillary puncture, with no signs suggestive of pain, and (100%) for those NB with contracted face and with pain signals. In a survey conducted with 29 preterm infants newborns (known in Brazil as RNPT) during the peripheral venipuncture, using the NIPS scale, 90% showed relaxed facial expression and 10% showed contracted face.17

When assessing the crying, it was found that 19.5% of newborns that did not feel pain were submitted to calcaneal puncture and showed grumblings. When referring to the presence of pain in NB, 43.7% of those who were submitted to peripheral venipuncture...
and 100% to capillary puncture also showed grumblings.

For the health professionals, the presence of pain in NB was identified through changes in physiological and behavioral parameters, among them is the crying.16,18

When the matter was to assess the leg movements of newborns who were submitted to painful procedure and showed no signs of pain, it was noticed from the NIPS that 100% of newborns who were submitted to peripheral venipuncture and 58.5% to capillary puncture remained with the legs movements relaxed. Of the newborns who felt pain, 90.6% were submitted to peripheral venipuncture and 100% to capillary puncture, both showed flexed and extended movements. For the arms movements, the values were virtually the same of the movements of the legs. These findings corroborate the results of another study.17

With regard to the state of awareness and breathing of the newborns who did not show signs of pain during venipuncture and capillary puncture, it was observed that most of newborns (95.8%) remained sleeping during the peripheral venipuncture and (92.7%) in the capillary puncture. This motivated NB to remain with relaxed breathing (100%), with no significant changing. The newborns who felt pain during the peripheral venipuncture and calcaneal puncture were observed, 100% of neonates showed state of discomfort and, subsequently, a larger percentage with changed breathing.

In a study on pain of newborns who were submitted to peripheral venipuncture, it was observed that during painful procedure significant physiological changes were not perceived, except for those NB who were hospitalized for a period exceeding one month, showing a too conditional behavior that when the cotton moistened with alcohol for disinfection of the skin was used, NB showed up disorganized and angry.14

Through the total score of the NIPS scale, 32 (57.1%) of the newborns experienced pain during the peripheral venipuncture procedure and 13 (24%) during the capillary puncture. The peripheral venipuncture is considered the most painful procedure performed on NB, followed by the examination collection of capillary glucose, removal of adhesive tapes from the skin, tracheal aspiration, excessive manipulation, dressings, phlebotomy, thorax drainage and minor surgeries without analgesia or even using analgesia.18

Given these findings, nursing professionals must perform difference in neonatal pain relief. The relationship between the NB and the nursing team is narrowed by the routine of the assistential procedures; this professional slowly awakens for the implementation of preventive measures, of reduction or elimination of allergic processes in the NICU, especially, in invasive procedures or those that are clearly painful.19

CONCLUSION

The study dealt with a complex and comprehensive issue, which outlines the pain of NB in the hospital environment. The NIPS scale was used as a tool to obtain the values of pain of NB.

The objectives of this study were met, because the pain of NB was sized by the NIPS scale. As for non-pharmacological measures used by nursing professionals in NB with pain, the glucose in 25% was as measure of first choice.

The pain of NB in the procedures of peripheral venipuncture and capillary puncture showed the concern of nursing professionals in relieving the pain. The researched nurses have used non-pharmacological measures in NB with pain.

Nonetheless, there is urgent need for further studies to explain the predominance of such measures in the neonatal setting. The dynamics of services and the high set of care performed by the nursing professionals influence the choice of the observational method for data collection. It is noteworthy to emphasize the NIPS scale served as support for this study, because through this we could rank the pain of the neonate and thus seek relief measures for pain relief.

REFERENCES

3. International Association for the Study of Pain. Pain terms: a list with definitions and


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