NASAL PRONGS IN PREMATURE NEWBORNS: PERSPECTIVE IN NURSING CARE
PRONGA NASAL EM RECÉM-NASCIDOS PREMATUROS: A PERSPECTIVA NO CUIDADO DE ENFERMAGEM
CÁNULAS NASEALES EN RECIÉN NACIDOS PREMATUROS: LA PERSPECTIVA EM EL CUIDADO DE ENFERMERÍA

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ABSTRACT
Objective: to evaluate the use of nasal prongs in premature newborns. Method: quantitative and qualitative study with the collection of data divided into two sections: semi-structured questionnaire for nursing staff; form filled out daily by the author through daily observation, monitoring eight premature infants in use of nasal prongs during the time of use, removing the prongs for evaluation, not compromising the clinical picture of the premature baby. Exclusion criteria were: use of time less than two days. After discharge of that ventilation mode the last completed form was used, held in neonatal intensive care unit in Petrópolis/RJ. The research project was approved by the Research Ethics Committee, CAAE: 11502812.6.0000.5245. Results: the most relevant result was that 100% of premature had some complications. Conclusion: most of the team answered the questionnaire cohesively, but it was found that they know what the necessary care is, but do not realize it.

Descriptors: Neonatal Nursing; Premature; Pressure Continuous Positive in Airway; Knowledge.

RESUMO
Objetivo: avaliar o uso da pronga nasal em recém-nascidos prematuros. Método: estudo quantitativo, com a coleta de dados dividida em duas seções: questionário semiestruturado para equipe de enfermagem; formulário preenchido diariamente pela autora através da observação diária, com acompanhamento de oito recém-nascidos prematuros em uso de pronga nasal durante o tempo de uso, retirando a pronga para avaliação, não comprometendo o quadro clínico do prematuro; critério de exclusão: tempo de uso menor que dois dias. Após alta desse modo ventilatório, foi utilizado o último formulário preenchido, realizado em unidade de terapia intensiva neonatal em Petrópolis/RJ. O projeto de pesquisa foi aprovado pelo Comitê de Ética em Pesquisa, CAAE: 11502812.6.0000.5245. Resultados: o resultado mais relevante foi que 100% de prematuros apresentaram alguma complicação. Conclusão: a maioria da equipe respondeu o questionário de forma coesa, porém, constatou-se que sabem quais os cuidados necessários, mas não o realizam.

Descritores: Enfermagem Neonatal; Prematuro; Pressão Positiva Contínua nas Vias Aéreas; Conhecimento.

REZUMEN
Objetivo: evaluar el uso de la cánula nasal en recién nacidos prematuros. Método: estudio cualitativo y cuantitativo con la recolección de datos dividida en dos secciones: cuestionario semiestructurado para equipo de enfermería; formulario completado diariamente por la autora a través de la observación diaria, con acompañamiento de ocho recién nacidos prematuros en uso de cánula nasal durante el tiempo de uso, retirando la cánula para evaluación, sin comprometer el cuadro clínico del prematuro; criterio de exclusión: tiempo de uso menor que dos días. Después del alta de ese modo ventilatorio fue utilizado el último formulario completo, realizado en unidad de terapia intensiva neonatal en Petrópolis/RJ. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación, CAAE: 11502812.6.0000.5245. Resultados: el resultado más relevante fue que 100% de los prematuros presentaron alguna complicación. Conclusión: la mayoría del equipo respondió el cuestionario coherentemente, sin embargo se constató que saben cuáles son los cuidados necesarios pero no las realizan.

Descripciones: Enfermería Neonatal; Prematuro; Presión Positiva Continua en las Vías Aéreas; Conocimiento.

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INTRODUCTION

In health area, scientific and technological advances factors have contributed significantly to the increase in life expectancy of the users, because the use of modern equipment available, the knowledge produced, drugs, methods and techniques.1

In general, the intensive care units are sectors where technological resources are frequently used, however, this rapid evolution has many concerns, especially to the specificities of a neonatal intensive care. The concerns generated from these new technologies used by professionals of the nursing staff in intensive care units are directed to the acquisition of knowledge and practices, to offer quality care, providing more safety for both the patient as for the professional, of the risks that are inherent in the action of caring.2

From the late 1970s, with technological developments, two non-invasive ventilation modes were developed, noninvasive intermittent with positive pressure ventilation and continuous positive pressure in the airway (CPAP).3

Respiratory distress is the condition that further leads to hospitalization of newborns in neonatal intensive care units (NICU). Its causes include respiratory distress syndrome, lung infections, and transient tachypnea of the newborn and meconium aspiration syndrome.4

It is important to highlight that the early use of this positive pressure minimizes the risk of complications associated with intubation and airway trauma. As oxygen therapy alternative there the continuous positive airway pressure (CPAP) - through the nasal prongs - improving ventilation and perfusion, protecting surfactant system, regulating breathing decreasing the work of breathing, reducing pulmonary vascular resistance and preventing alveolar collapse.5

Nasal prong is the flexible, lightweight device connected to nostrils simply offering the CPAP, and being less invasive and available in several sizes.6 The use of nasal prongs that is short and less resistance to airflow (higher internal diameter) is the simplest form of offering CPAP mode and produces better therapeutic effects being less invasive and it has been used in about 37% of newborns weighing less than 1,000 grams, in 59% of newborns weighing 1,000 and 1,500 g and 83% of preterm infants with higher weight than 1,500 gr.7

The nasal prongs may cause local complications such as nasal obstruction by edema, nasal bleeding, deformities and necrosis of nasal septum or even stenosis of choana. It can also occur pulmonary complications such as pneumothorax, interstitial emphysema, pneumomediastinum and bronchopulmonary dysplasia. However, when compared with mechanical ventilation, CPAP has lower frequency of barotrauma.8

Despite the indication and function of CPAP, it is necessary to establish as a priority, continuous monitoring, which involves the whole technological process, being of paramount responsibility of the nursing team, from installation to maintenance of this devices in a nasal mucosa, which above all it is sensitive.9

This study is justified by the affirmative: constant commitment of the nursing staff is essential on the adequacy, system installation and maintenance, and especially in monitoring the NB. Training, skills and specializations are strategies that can improve care to the NB in CPAP with prongs, making this practice safe and avoiding complications from its use both in short and long term, hindering its acceptance and endangering its effectiveness.5

OBJECTIVES

● To assess the proper use of nasal prongs in premature infants; to determine the prevalence and occurrence of the use of prongs in premature infants;

● To check the prevalence and occurrence of complications associated with the use of prongs of premature newborns;

● To identify factors associated with damage by the use of prongs.

METHODOLOGY


This study is qualitative and quantitative approach, with descriptive and exploratory character. It was performed with eight premature newborns hospitalized to the neonatal intensive care unit in a public teaching hospital of medium size in the mountainous region in the city of Petrópolis - Rio de Janeiro, in order to identify and assess the complications arising from the use of prong nasal; and with all the nursing staff, totaling 30 professionals. One interview was carried out to their knowledge about the care with the use of nasal prongs.
Newborns who used nasal prongs with less than two days of use were excluded.

A semi-structured questionnaire was applied to all nursing staff, total of 30 employees, being made a general analysis of the content; and through non-participant observation, a semi-structured form was created and filled by the researcher, monitoring eight premature newborns in use of nasal prongs. The form was filled once a day during operation being conducted examination of the nostrils daily, removing the prongs quickly for review, and does not compromise the clinical condition of premature newborns.

After discharge of that ventilation mode, the completed form before it was used. If when completing the form a complication was observed, it was evaluated according to the degree of injury - mild, moderate or severe.

The data collection period was during 03/2013 and 05/2013 and the investigation period was from 05/2013 to 06/2013 to elucidate the other objectives and realize the discussion of this research.

By calculating the prevalence and occurrence of complications associated with the use of nasal prongs brand HUDSON RCi®, Model 1683 which is used in this unit (and the size will be that the NB is using at the time of observation).

At the end of data collection, complications with the knowledge of the nursing team that was questioned about knowledge and care was related to the use of nasal prongs in premature newborns.

This research was conducted after approval in accordance with Resolution 196/96 of the Research Ethics Committee, held by the Foundation Octacílio Gualberto with CAAE Number: 11502812.6.0000.5245, protocol: 209,547 and the consent form signature (TCLE), of those responsible for the newborns, nurses and the institution where the research took place.

RESULTS

- Quantitative Analysis

During the research period, there were 60 hospitalizations in the NICU. Among them, 40 were premature newborns (66.5%) and 20 newborns considered at term (33.3%). Among the 40 preterm newborns, 25 (62.5%) used nasal prong CPAP at some point in their hospital, where eight preterm infants (20%) were included in the research because they used the nasal prongs for two days or more.

The results were as follows:

![Figure 1. Continuous education for the nursing staff](image1)

![Figure 2. Size of the prong related to weight](image2)

Thus, it is questioned: if most of NBs were with the prongs according to weight, why not all of them used it? We can conclude that there is a lack of attention and/or care, negligence, lack of will to carry out care properly.

In analyzing the question: septum protector and cap or bandage were used to help in fixing the nasal prongs and the system. It was shown that 100% of NBs used septum protector at the time of observation and 100% used cap to help securing the nasal prongs and the system also upon observation, even though not all are according to the weight, it is suggested that this may arise some kind of complication.
It has been seen that 100% of the observed NBs were not having septal massage with Essential Fatty Acids, moisturizer or other oil. Thus, it will likely appear some kind of injury as hyperemia due to pressure in the septum and the prongs and then reducing blood flow at that place.

With the question if the upper airways were being aspirated when needed happened the opposite, happening with 100% of NBs, important fact because as the nostril NB is small, it is easy for obstruction, causing apnea and saturation or even hypoxia.

Unfortunately, all NBs (100%) at the time of observation had some type of complication such as: redness, deformity, bleeding and injury to the septum.

A high quantity of newborns had a moderate level of complication like bleeding and septal lesion healing with presence of a crust. Fortunately, it was not observed any severe complication.

• Qualitative Analysis

This method was analyzed through content analysis of a proposed question that assesses knowledge of the nursing team regarding the care that is needed to premature newborns in use of nasal prongs.

◆ 1st Category: Adequate Care

This category showed that the nursing staff has the knowledge to provide the necessary care given to the newborn. It was created from the data saturation, through an interview, together with the non-participant observation.

As treatments evolve, professionals should direct their interventions and therapies involved in the use of technology, knowing that it the nursing team’s responsibility to prevent the possible harmful effects of nasal CPAP, considering such implications are indicators of nursing quality of care. The main answer was selected:

Interviewee 6: “septum massage with dersani® 3/3h, do not squeeze the prongs into the nostrils positioned correctly; always aspire when necessary, humidifying the nostrils; observe proper size of the prong to theNB”.

In general, the team showed to be consistent in their responses, but all NBs who were monitored during the research presented some type of complication. It was concluded that the team has the knowledge, but does not use it. Due to this condition, sub-categories were created.

◆ 1st Subcategory of Proper Care

◆ Septum Injury: The importance of massage

In the multiplicity of answers, the septum massage was mentioned, but during the monitoring by non-participant observation that massage was not observed actually to be carried out, bringing the effect of hyperemia of the nasal septum of most NBs, and one NB presented a crust in the septum. In this way, they know the need of massage in the septum to prevent injuries, but they do not do it.
Nasal prongs in premature newborns: perspective...

To alleviate traumas in the nose and necrosis of nasal septum, the massage in the nasal septum is an excellent intervention, so there is a better evolution of the newborn to the use of CPAP.  

**2nd Subcategory of Proper Care**  
**Septum Protector**  
The nasal prongs should not be leaning on the septum since it can cause a stroke due to decreased circulation and pressure that is exerted on it.  

During the research it was noted that all NBs used the septum protector. However, all NBs had some type of complication, especially hyperemia, concluding then that even using the septum protector, when the prongs press the nostrils does not allow this mode ventilation, so the team did not concretized the necessary care.

Today, the hydrocolloid is the most cited material especially internationally, as a preventive measure for the appearance of lesions. Even so, injuries are still observed, but to a lesser extent, making it clear that issues related to cost-benefit should be reassessed in study centers using prongs.

**3rd Subcategory of Proper Care**  
**Prong size**  
When the prongs has its largest size than necessary, it causes injury in nostrils and when it is smaller, it does not have the expected effect due to the escape fraction of inspired oxygen (FIO$_2$), so it is important the size, to really make this ventilation mode effective.

The choice of the appropriate number of prong to the size of the NB is a leading care based on this improvement, followed by the oropharynx and nasopharynx aspiration, adjustment and setting of the prong, maintenance of the adequate and comfortably neonate position, circuit exchange, among others.

**4th Subcategory of Proper Care**  
**VAS aspiration**  
Through interviews it was shown that the aspiration of the upper airways is an important care that should be offered to the newborn in use of nasal prongs therefore considered a positive point in relation to the care provided by the nursing staff.

During non-participant observation of the nursing team, the NBs in use of nasal prongs have excessive nasal secretion and oropharyngeal, needing to be vacuumed. In this respect, there is a paradox. According to the Ministry of Health the nostrils aspiration should be avoided just by increasing the risk of internal injuries and bleedings.  

According to the responses, the observed NBs used the prongs due to weaning from mechanical ventilation and need for positive pressure at the end of expiration, so there is an accumulation of nasal secretion and oropharyngeal by difficulty in swallowing, and usually the need to aspirate VAS.

**5th Subcategory Assistance Adequate**  
**VAS Humidification**  
Analyzing the responses, most of the staff responded as necessary care with the NB using nasal prongs the humidification of VAS before aspiration, but it was not observed being used. The humidification of the nostrils before aspiration is important because oxygen causes a drying of it. When the aspiration probe is introduced, there may be rupture vessels leading to bleeding and clot formation, thus when the procedure is repeated again, bleeding and clot formation will happen again, being broken again and increasing the injury, bleeding and formation of clots. When the NB is presenting this clinical picture, there is a need of great attention because it causes airway obstruction and consequently fall saturation and destabilization of the child, delaying his recovery, leading to a possible tracheal intubation to the improvement of this injury nostrils.

Humidification and heating gas for oxygen administration to the NB are necessary as well as moistening with water or saline of the nasal prongs, since the humidification provides the fluidity of secretions.  

According to the experience, in practice there has been a better fluidity of secretions, the use of humidification of VAS also before the vacuum, because, as it is only in the upper airways, the same humidified oxygen causes dryness.

**2nd Category: Knowledge Deficit**  
By creating the category knowledge deficit, it was noticed that 13.3% of the team showed ignorance regarding the use of the prong, showing a significant percentage when it comes to intensive care of premature newborns.

It is necessary much more than material resources to the success of CPAP use with prongs. The constant commitment of the nursing staff on the adequacy is essential for system installation and maintenance, and especially in monitoring the neonate.
Subcategory of Knowledge Deficit

The importance of continuing education

It is not enough to “know” or “do”, it is necessary “know-how”, interacting and intervening, and for that, it must have the following characteristics: the ability to constantly learn, to relate theory and practice and autonomy, so relating the inseparability of knowledge and action.10

According to the responses obtained through the interview, it became very important the valorization and the clarification of the ways of learning geared to the sphere of nursing, aiming at raising awareness among professionals regarding the care to the newborn using of nasal prongs.

It should be considered that this research was conducted in an ICU and 13.3% is a relatively high percentage of people with lack of knowledge that is needed to perform care effectively with the NB in use of nasal prongs.

To realize this category, an example of the answer obtained was quoted: “aspiration when needed, continuous monitoring + pulse oximetry (saturation) and all care. Peripheral vein for the event, see the child as a whole”.

It is shown that this care is very superficial for a NB who is in need of a noninvasive ventilation mode, but with continuous positive airway pressure nasal prongs. It is known that such care are inherent in children who are hospitalized in a NICU.

In this way, it becomes extremely important to raising awareness and updating of all nursing staff; there is always an information-sharing by influencing the way to take care, and there is a group of people who do not have the proper wisdom affecting the action team.

DISCUSSION OF RESULTS

It should be noted that nurses by being care managers in NICUs need to be aware of the technical and scientific advances, recognizing that diversification of their activities requires the update, develop and contribute to specialization, teaching seen that updating of staff and related professionals in severe NB assistance has a big responsibility.5 Therefore, it is emphasized the importance of places and rules of operation employing them by the nursing staff. These rules should aim to better oxygenation and reduction of complications.

The nasal injuries in newborns through the use of continuous positive airway pressure with prongs is a subject little discussed at national level. However, references, mainly international, emphasize that secondary nasal complications to prongs are present mainly in preterm and low birth weight neonates due to lung immaturity, requiring early prong in CPAP mode.

Study mentions that the greater the number of prongs, the lesser resistance and, consequently, the better pressure supplied. Prong with correct diameter reduces air leakage and prevents tissue nasal damage.6 The installation of the CPAP system in Brazil, is still from the internationally recommended. The CPAP system fixation technique, size of the prong, size of the cap, presence of nasal protection and permanent surveillance on the device position in the nostrils of newborns are factors that, when used correctly, can prevent the development of nasal lesions.

Although researchers specialized in the subject claim that despite prevention, it is unlikely the incidence of nasal lesions be reduced to zero, the risk factors can and should be minimized through the correct device and technical jobs.6

In this context, the nursing staff is indispensable for better recovery and prognosis of the NB making the use of VNI through the nasal prongs to be effective, reducing the length of hospital stay, risk of infection and possible complications.

CONCLUSION

According to the data analysis, it is concluded that the use of nasal prongs in the research institution was wrong because they were not careful of correct measures used with the NB using nasal prongs, as the non-operation of nasal septum massage with some kind of moisturizing oil, a considerable amount of NBs with the prongs of inappropriate size and pressing the nostrils and not wetting the nostrils before aspiration. This care is very important for the prevention of nasal lesions.

All NBs who used the nasal prongs had some type of complication, which means once again that some of the necessary precautions were not provided. Therefore, in this study, the protective model did not interfere in the formation of lesions, as they were observed in all newborns in the study after two days in device usage.

However, positives issues in care were seen as the aspiration of the airways when necessary, the use of caps to assist in fixing the system to the NB and the septum protector in all NBs.
It also concludes that the time in which the NB uses the nasal prongs is not relevant but the nursing care is important during its use. Staff simply demonstrated not wanting suffering a stress, being negligent and reckless with these NBs.

It should be strengthened with the nursing staff, the importance of using this ventilation mode and benefits to the newborn. Therefore, it is a noninvasive ventilation method and has great effectiveness. The outreach team is needed, focusing on the necessary care, as this is the sole responsibility of nursing, and the lack of care can prolong hospitalization of children exposed to nosocomial infections, causing more trouble to the family of this NB. The complications that were observed were not serious, but the team knows, have the knowledge, but does not use it.

Training and capacity building are strategies that can improve care to newborns in CPAP with prongs, making this practice safe and avoiding complications such as effect of its use. Studies in this line of research are required to develop new devices and fixation methods that reduce nasal trauma.

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