RESUMO

Objetivo: analisar os fatores de risco para lesões de pele em recém-nascidos hospitalizados em uma Unidade de Terapia Intensiva Neonatal. Método: trata-se de um estudo misto, descritivo, realizado em uma Unidade de Terapia Intensiva Neonatal de um hospital de referência. Coletaram-se os dados por meio da sistemática das lesões de pele nos recém-nascidos, pelas informações dos prontuários e uma entrevista com a equipe de Enfermagem. Resultados: aponta-se que os profissionais atribuíram as lesões de pele às punções venosas, à fixação de adesivos aplicados diretamente na pele, à má utilização da Sistematização de Enfermagem, ao uso de produtos químicos para limpeza, à falta de rotação dos sensores na pele, aos hemoderivados, às medicações (extravasamento) e à fototerapia (Bilitron). Conclusão: conclui-se que a investigação possibilitou identificar os fatores de risco relativos às características ao nascimento, além dos fatores ambientais, mecânicos e físicos e, ainda, como os dias de internação contribuem para a ocorrência das lesões de pele no recém-nascido.

Descritores: Pele; Recém-Nascido; Prematuro; Assistência de Enfermagem; Serviços de Saúde Neonatal; Unidade de Terapia Intensiva Neonatal.

ABSTRACT

Objective: to analyze risk factors for skin lesions in newborns hospitalized in a Neonatal Intensive Care Unit. Method: this is a mixed, descriptive study, carried out in a Neonatal Intensive Care Unit of a reference hospital. The data was collected through the systematics of skin lesions in newborns, information from medical records and an interview with the Nursing team. Results: it is pointed out that the professionals attributed the skin lesions to venous punctures, the fixation of adhesives applied directly on the skin, the misuse of the Nursing System, the use of chemical products for cleaning, the lack of rotation of the sensors on the skin, the hemoderivatives, the medications (extravasation) and the phototherapy (Bilitron). Conclusion: it is concluded that the investigation made it possible to identify the risk factors related to the characteristics at birth, as well as the environmental, mechanical and physical factors, and also how the days of hospitalization contribute to the occurrence of skin lesions in the newborn.
RESUMEN

Objetivo: analizar los factores de riesgo de lesiones cutáneas en recién nacidos hospitalizados en una Unidad de Cuidados Intensivos Neonatales. Método: se trata de un estudio descriptivo mixto, realizado en una Unidad de Cuidados Intensivos Neonatales de un hospital de referencia. Los datos se recolectaron a través de la sistemática de lesiones cutáneas en recién nacidos, mediante informaciones de historias clínicas y entrevista con el equipo de Enfermería. Resultados: se señala que los profesionales atribuyeron las lesiones cutáneas a punciones venosas, a la fijación de adhesivos aplicados directamente a la piel, al mal uso de la Sistematización de Enfermería, al uso de productos químicos para la limpieza, a la falta de rotación de los sensores en la piel, a los hemoderivados, a los medicamentos (desbordamiento) y a la fototerapia (Bilitron). Conclusión: se concluye que la investigación permitió identificar los factores de riesgo relacionados con las características al nacer, además de los factores ambientales, mecánicos y físicos, y también cómo los días de hospitalización contribuyen a la ocurrencia de lesiones cutáneas en el recién nacido.

Descriptors: Piel; Recién Nacido; Prematuro; Cuidado de Enfermería; Servicios de Salud Neonatal; Unidad de Cuidados Intensivos Neonatales.

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INTRODUCTION

The integrity of the skin is directly associated with gestational age at birth, since the development of the skin barrier occurs rapidly between the 24th and 34th weeks. It is understood, in this logic, that the skin structure of the term Newborn (NB) is similar to that of adults; already, in the Preterm Newborn (PTNB), the epidermis is significantly thinner and the stratum corneum is still malformed.
As a result, the skin of the Preterm (PT) may suffer lesions more easily and increased permeability may result in greater water loss, electrolyte imbalance, dysthermia and greater exposure to environmental irritants and infectious agents.\textsuperscript{1}

It is pointed out that the maintenance of the integrity of the PTNB skin is fundamental, since this is a protective barrier of the internal organs, highlighting that some factors, such as dermatitis, burns, ulcers and traumatisms, can impair the protective function of this membrane.\textsuperscript{2}

It is known that the risk factors that may cause skin lesions in the NB are present in the clinical practice of the nurse acting in the Intensive Care Unit (ICU), where the assistance is characterized by high quality and complex technical care and is based on permanent monitoring, continuous assistance and the incorporation of technologies, a context that demands continuous qualification. For this, it is evaluated that the Nursing team must learn the technical-scientific knowledge and the practical capacity enough to recover the health of the being involved.\textsuperscript{3}

The Neonatal Intensive Care Unit (NICU) is characterized as an appropriate therapeutic environment for the treatment of severely ill neonates, which relies on state-of-the-art technology and diversified equipment, in addition to highly trained professionals and specific protocols for the care of the newborn. It is pointed out that the work in the NICU requires, from the nurse, an integral attention to meet the needs of the NB and monitor the signs and the development of their treatment.\textsuperscript{4}

It is noticeable that the hospitalization in the NICU and the several procedures and maneuvers performed in the care of the newborn expose him to many risks for skin lesions and infections, contributing considerably to the increase of morbidity and mortality of this population. In this scenario, pressure lesions, shearing, lacerations, traumas, burns, chemical irritants, drug overflow, incontinence and infections, such as those that occur more frequently, stand out.\textsuperscript{1}

It is observed that the prophylaxis of these lesions is largely due to the team that cares for the patient, especially nursing, which is responsible for several prevention mechanisms, either in administrative activities, supervision and staff training, or in the care given to the NBs admitted to the NICU.

It is noted, with this purpose, that the Nursing team, for having the professionals that most manipulate the newborn, must develop precise care in order to protect the skin of the NBs, because this is one of the main barriers of the organism that, when damaged, can open doors to microorganisms.\textsuperscript{5}

It is noted that the World Health Organization (WHO), in 2013, launched the World Alliance for Patient Safety and, in partnership with the Joint Commission International (JCI), has been encouraging the adoption of the International Patient Safety Goals (IPSG). The objectives of this program, now called the Patient Safety Program, include organizing concepts and definitions of
patient safety and proposing measures to reduce risk and mitigate adverse events. It is verified that two of the six IPSGs are directed to prevent adverse event situations of infections associated with care, as well as the prevention of pressure lesions and other injuries.\textsuperscript{6}

It is verified, in Brazil, that the National Patient Safety Program (NPSP) foresees that the evaluation and the prescription of skin care are attributions of the nurse and the participation of the multiprofessional team in the prevention of the alterations is fundamental in the contribution for the prescription and the planning of the care with the patient at risk.\textsuperscript{6}

It is necessary to draw up a specific care plan for the skin of the newborn. It is required the development of precise care, such as the use of adhesives, pulse oximeter rotation, diaper changing, invasive procedures, systematic skin evaluation, besides specific care with the premature skin, among others, in a systematic and objective way.\textsuperscript{5}

It is emphasized that the interest in the subject derives from the experience of residency in Neonatology, lasting one year, in which it was possible to observe skin lesions with a certain frequency in premature babies and also from the perception of the need for the team to act in a more systematized way, with protocols and guidelines for PTNB skin care, in the NICU environment.

The following guiding questions were defined, based on the hypothesis that the adequate skin care of the NB hospitalized in the NICU reduces the risk of complications: "What are the risk factors for skin lesions occurring in the NB hospitalized in the NICU in the opinion of the Nursing team?" and "How to prevent skin lesions in the NBU hospitalized in the NICU?".

**OBJECTIVE**

To analyze risk factors for skin lesions in newborns hospitalized in a Neonatal Intensive Care Unit.

**METHOD**

It is a mixed, descriptive study, carried out in the NICU of a public hospital of high complexity, a state reference in obstetric and neonatal emergency care, located in the city of Fortaleza (CE). It is pointed out that the NICU has 25 beds of high complexity, besides a multiprofessional team composed by doctors, nurses, physiotherapists, speech therapists, nursing auxiliaries/technicians, social workers and psychologists, according to the norms of the Ordinance nº 930/2012 of the Health Ministry. It is exposed that the unit receives PTNBs from the delivery rooms, from the Kangaroo Intermediate Care Unit (KaINCU) and from the Conventional Intermediate Care Unit (CoINCU), which have congenital malformations or need more specific care.

For the sample composition, it was considered the length of stay of the NBs in the unit, calculated, on average, in 20 days, which indicates the low turnover of babies in this sector; on the other hand, the limited time for data collection made it impossible to compose a larger sample. In this context,
the participants were randomly chosen, based on inclusion criteria, such as being born in the referred hospital, being premature, being in the NICU and presenting skin lesion during the data collection period. Infants with lesions due to the occurrence of childbirth, such as tocotraumatism, were excluded. A total of 20 NBs were added to the final sample.

Data was collected from November 2015 to June 2016 in two stages. Initially, the documentary survey was carried out, in which the information contained in the baby's medical records were used. Subsequently, the systematic observation of NBs in incubators was carried out.

The information was organized in a questionnaire prepared by the research team, which contained the study variables: weight; sex; gestational age; conditions at birth; neonatal infection; days of hospitalization; medication; surgery; place of birth; transference; use of technologies; ventilation modes; venous access; feeding; phototherapy; types of phototherapy; manipulation by the team; manipulation by the mother; performance of physiotherapy; use of hygiene/sepsis solutions; physical factors; types of injuries and type of delivery. It is noted that the first part of the instrument dealt with the identification data and the second dealt with the data of hospitalization, the search for data in the medical records and the observation of NBs.

The qualitative segment of the study was carried out with 25 nursing professionals, 11 nurses and 14 mid-level professionals, including nursing auxiliaries and technicians of different shifts. As criteria for inclusion in the research, they used to work in the unit for more than six months and perform direct care to the PTNBs in the sector. It is specified that all participants signed the Free and Informed Consent Term (FICT) and allowed the disclosure of the results.

The data was collected through a semi-structured questionnaire applied to each participant. The interviews addressed questions regarding the causes of skin lesions, ways to prevent these lesions and the role in the care of PTNB with skin lesions. Then, for the analysis of the results, it was used the technique of thematic analysis of Minayo, which comprises three stages: pre-analysis; exploration of the material and treatment of the results obtained and interpretation.

In the pre-analysis, the literal transcription of the interviews and the elaboration of the registration units were carried out. The data were coded and grouped, in the exploration phase of the material, according to their similarities and differences, generating categories. Finally, in the treatment of the results obtained and interpretation, the most significant statements were selected, which were discussed from authors studying the subject in question.

It is pointed out that the study followed all ethical and legal aspects that involve research with human beings, according to the norms and guidelines of Resolution 466/12 of the National Health Council. The confidentiality of the data collected, which were used for strictly scientific purposes,
was guaranteed. It should be emphasized that the data collection started only after the approval of the Research Ethics Committee, with the approval opinion of number 1232471.

RESULTS

It is noticeable, in table 1, that environmental factors greatly influence the occurrence of skin lesions, since they contribute to cause incidents that lead to the lesion. It is noteworthy that 100% of babies used the pulse oximeter. It is evaluated that the physical factors favor remarkably the appearance of the lesions in the admitted babies.

Table 1. Description of environmental risk factors for skin lesion. Fortaleza (CE), Brazil, 2016.

| Environmental factors                  | n  | %  |
|----------------------------------------|----|----|
| Non-invasive technologies              |    |    |
| Pulse Oximeter                         | 20 | 100.0 |
| Types of ventilation*                  |    |    |
| IMV                                    | 16 | 80.0 |
| NIV                                    | 2  | 10.0 |
| CPAP                                   | 12 | 20.0 |
| Hood                                   | 4  | 20.0 |
| Types of venous access*                |    |    |
| PICC                                   | 11 | 55.0 |
| Umbilical venous catheters             | 7  | 35.0 |
| Central venous access                  | 6  | 30.0 |
| Peripheral venous access               | 3  | 15.0 |
| Type of feeding*                       |    |    |
| Orogastric probe                       | 17 | 85.0 |
| Zero diet                              | 4  | 20.0 |
| Parenteral nutrition                   | 2  | 10.0 |
| Oral route                             | 1  | 5.0 |
| Use of eye protection                  |    |    |
| Yes                                    | 14 | 70.0 |
| No                                     | 6  | 30.0 |
| Types of photo*                        |    |    |
| Bilispot                               | 12 | 60.0 |
The skin of the NB is characterized as delicate, thin and fragile. The use of medical devices, essential to the care provided in the NICU, detects an increased risk of skin lesions. It is oriented that Nursing actions should be individualized, based on scientific knowledge and based on integrated team work, in order to avoid and/or reduce skin lesions in this portion of the population during their hospitalization.

It is warned that it is not known whether these septal lesions occurred due to catheter contact with the nasal septum or due to the poor condition of the prongs that were used in these babies, which were made of rigid plastic material, due to the long time of use and the form of sterilization to which they were submitted.

It is understood that the use of CPAP has been studied and analyzed, with evidence of reduction of complications by the prolongation of invasive mechanical ventilation; however, its use is not without complications.

Nasal lesions in hospitalized neonates are evaluated as common. It is noteworthy that, due to their locations, these injuries may have been caused by devices such as continuous positive airway pressure (CPAP) masks.

It is recommended that the system (prong and trachea) be used only once, because its disinfection can cause wear, making it more rigid and less malleable. It is also recommended that it be well stabilized because its mobility causes pressure and trauma inside the nostrils. It is observed that the use of the adhesive protection between the nostril and the prong avoids direct friction and can relieve the pressure and prevent injuries.

Table 2 shows the description of the mechanical risk factors for skin lesion.

Table 2. Description of mechanical risk factors for skin lesion. Fortaleza (CE), Brazil, 2016.

| Mechanical factors                  | n  | %  |
|------------------------------------|----|----|
| Manipulation by the health team    |    |    |
| Four times                         | 13 | 65.0 |
| More than six times                |  7 | 35.0 |
| Maternal touch                     |    |    |
| Once                               |  3 | 15.0 |
| Twice                              |  1 |  5.0 |
Without touch | 16 | 80.0
Perform physical therapy
Yes | 9 | 45.0
No | 11 | 55.0
Use of solutions*
Chlorexidine | 15 | 75.0
Soap | 13 | 65.0
Alcohol | 4 | 20.0

Note: * more than one answer per item.

It was observed, according to table 3, the description of the physical risk factors for skin lesion.

Table 3. Description of physical risk factors for skin lesion. Fortaleza (CE), Brazil, 2016.

| Physical factors         | n  | %    |
|-------------------------|----|------|
| Cleanliness             | 18 | 90.0 |
| Humidity                | 1  | 5.0  |
| Objects in bed          | 1  | 5.0  |

The data in table 4 shows the description of the type of injury according to the days of hospitalization.

Table 4. Description of the type of skin lesion according to the days of hospitalization. Fortaleza (CE), Brazil, 2016.

| Type of lesion                 | Three to five days | Six to ten days | More than 11 days |
|--------------------------------|--------------------|-----------------|-------------------|
| Lower abdomen (burns)          | 2                  | 3               | -                 |
| Nasal septum                  | 1                  | 5               | 6                 |
| Lesion in the lateral vast     | 1                  | 1               | -                 |
| Pressure ulcer                 | -                  | 1               | -                 |
| **Total**                      | **4**              | **10**          | **6**             |

The data in tables 2 and 3 are thus justified in table 4, since, according to table 2, only 20% of the NBs used CPAP-type oxygen therapy, obtaining, even with a low incidence, 12 babies with nasal septum injury, of which only one baby had from three to five days of hospitalization, five babies had from six to ten days of hospitalization, and the others (six babies) had more than 11 days of hospitalization in the NICU.
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It is noted that a baby presented a pressure ulcer in the parietal region of the skull, developed from the lack of decubitus change, since it had been submitted to the implantation of a valve (PDV) for the treatment of hydrocephalus. It is suggested that the Nursing team should have carried out a more rigorous care plan to make decubitus changes more frequently, in order to avoid this type of injury and, consequently, possible damage to this baby's health.

From these data, it is defended that the greater the number of days the babies are hospitalized, the greater the number of manipulation of the multiprofessional team, the greater the exposure to the types of oxygen therapy and environmental risks and the greater the incidence of skin lesions in the neonates hospitalized in this NICU.

The data analysis generated two categories: "Causes attributed to skin lesions of the NB" and "Nursing care in the prevention and treatment of skin lesions of the NB".

### Causes attributed to the skin lesions of the NBs

The professionals attributed the skin lesions to venous punctures, the fixation of adhesives applied directly to the skin, the misuse of the Nursing Care System (NCS), the use of chemical products (such as alcoholic chlorhexidine), the lack of rotation of the sensors in the skin, hemoderivatives, medications (overflow) and phototherapy (Bilitron), which makes the epithelial tissue more susceptible to lesions.

It was identified that the pressure ulcers occurred due to skin contact of the PTNBs with wires and sensors of oximeters and cardiac monitors, as well as NBs with post-surgical implantation of PDV due to lack of rotation in the position of the baby.

It is noteworthy that both nursing professionals and nursing auxiliaries and technicians have reported other causes of skin lesions, such as incorrect change, lack of decubitus change of NBs, as well as the incubator sheets with folds under the babies’ skin, edema and excessive collection of exams.

Prematurity is understood as a physiological condition, however, there are the non-physiological factors, such as the disposition of the NB in the bed, use of inadequate blankets, incubator temperature, use of adhesives and adherents, and the use of inadequate solutions (related to alcohol). In addition, physiological factors can also be described as contributors: decreased skin...
structure, such as the absence of layers; loss of imperceptible liquids; severe health condition that prevents decubitus change and metabolic changes, in addition to iatrogenic.

The use of the nasal CPAP was frequently cited as an agent causing the lesions, as a consequence of the lack of protection of the nasal septum, besides the lack of nasal massage by the team during the babies' handling and inspections.

**Nursing care in the prevention and treatment of skin lesions of the NB**

In view of the fact that the NBs are hospitalized in an intensive care unit, which is heavily manipulated due to the necessary procedures for life support, the breakage of the protective membrane may occur. Thus, skin care should be doubled, and there should be, according to the professionals, a periodic inspection of the skin of the NBs.

It was found that several measures could be implemented for the prevention of PTNB skin lesions, such as the care with the fixations, in-service training, use of special solutions in the PTNB skin, substitution of alcoholic solutions when possible, adequate mattresses and frequent decubitus changes, implementation of the NCS, institute the use of PICC avoiding unnecessary punctures, restricted use of adhesives, rotation of oximeter sensor, use of fixations with hydrocolloid, besides all the care with handling of NBs.

It is understood that maintaining the integrity of the skin of the NB, especially the PT, despite being a challenge for professionals who work in the NICU, should be prioritized during care, because it contributes to the non-occurrence of lesions that can cause infections and longer hospitalization, impacting on the increased chances of survival of these clients. It is suggested that the nurse should sensitize the team, providing harmony among its members, seeking to ensure the standardization of care through the implementation of the NCS and consequently have an improvement in care provided.¹

Therefore, it is known that the Nursing team is one of the main responsible for the care of NB at the NICU. As simple as it may seem to be the care performed in the Nursing routine, from the moment the baby is admitted to the hospital until his discharge, it is important to point out that severe NB is submitted to a series of handling and procedures that may favor the appearance of lesions due to their repetitive frequency and fragility of the skin.

It is observed that all these actions are contemplated when the assistance planning occurs, attending the need of each patient, using alcohol-free solutions, adequate adhesives, carrying out the decubitus change and promoting the qualification of the health professionals' team both for the care provision and for the clients' skin surveillance.

**CONCLUSION**
It is concluded that the investigation made possible the identification of risk factors, such as characteristics at birth, in addition to environmental, mechanical and physical factors, as well as the days of hospitalization, which contribute to the occurrence of skin lesions in the NB.

It is considered, in this sense, that the performance of the Nursing team professionals in the prevention and treatment of PTNB skin lesions is a challenging action, given the need for constant handling of children. It is also pointed out that the realization of a holistic, planned, organized and qualified assistance depends on the training of sensitive professionals, acquired through their daily experiences of care, participation in programs of permanent education in service and reflection about their commitment to the NB.

Through the results, a reflection is promoted on the importance of the quality of the work process of the Nursing team during the development of assistance actions that avoid the aggravation of the hospitalized babies. This way, it contributes to the improvement in the quality of the assistance to the children's health, with a bigger investment in the actions of health promotion and prevention of aggravation to the babies' skin.

CONTRIBUTION

It is informed that all authors contributed equally in the conception of the research project, collection, analysis and discussion of the data, as well as in the writing and critical review of the content, with intellectual contribution and in the approval of the final version of the study.

CONFLICT OF INTERESTS

Nothing to declare.

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