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Nursing Care with the Skin of Hospitalized Newborns: Integrative Review

REVIEW

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Abstract

The objective was to analyze the scientific collection on nursing care with the skin of hospitalized newborns. In order to reach the objective, an integrative review was conducted. The search for primary studies was performed in the databases LILACS, MEDLINE, BDENF and PUBMED. The included studies (n=10) were grouped into thematic categories: risk factors for skin lesions in hospitalized newborns and their consequences; and nursing care to promote the integrity of the skin of hospitalized newborns. The main care identified were lubrication with emollient agents, use of hydrocolloids and transparent film, changes in decubitus, hygiene techniques, phototherapy and invasive procedures. The results of the review offer guidance for the conduction of researches that investigate interventions that are more effective in the prevention and treatment of skin injuries and their consequences.

Keywords
Nursing Care; Newborn; Skin.

Introduction

Since it is a period full of physiological changes and adaptive changes, the neonatal period requires a differentiated, continuous and humanized care of the nursing team. The importance of actions to promote the quality of life and reduce vulnerabilities outside the uterine environment stands out in this care [1].

In order to ensure adequate care for the neonate's health, the nursing professional must seek to meet the needs for nutrition, hydration, hygiene, safety and comfort, in order to reduce predisposing stimuli of diseases, injuries or harms to these vulnerable beings. Thus, main-

taining the integrity of the skin of newborns is one of the main indicators of quality of care, as it allows preventing skin lesions, significantly reducing the rate of infections and other serious complications such as sepsis [2-3].

In addition to representing an important barrier of immunological protection, the skin also performs functions of thermoregulation and maintenance of the hydroelectrolytic balance, participation in the synthesis of vitamin D, capture of sensations of pain, heat, cold, touch and pressure, essential characteristics in the adaptation to the changes from the extrauterine environment. The skin of the newborn has singularities that makes it more susceptible to damages, if compared to the skin of an adult. Among these differences, there are the thickness 40 to 60% thinner, the smaller amount of hair follicles, the reduced dermal-epidermal cohesion, the greater ratio between the body surface area and the weight, which provides greater risks of ruptures and increased percutaneous absorption of toxic substances and pathogenic microorganisms [4].

Maintaining the skin integrity is fundamental for the health of neonates, especially for premature babies, that is, those with a gestational age of less than 37 weeks, in addition to those hospitalized because they are frequently subject to the continuous handling of the multiprofessional team, as well as to the performance of invasive procedures, the use of antiseptic substances, the adhesion of adhesives and monitoring sensors, and exposure to common bacterial flora in hospital settings [5-6].

In this sense, the nurse, acting in the neonatal care, must know the cutaneous particularities of newborns and carefully evaluate them, in order to prevent iatrogenic lesions associated with the adopted therapies. Thus, nursing is responsible for developing strategies that allow maintaining the skin integrity, aiming at reducing the frequency and severity of injuries caused by routine care procedures, seeking to reduce complications and maintain quality of life. Thus, the present study aims to analyze the scientific collection on nursing care with the skin of hospitalized newborns.

Methods

In order to reach the objective, the integrative review was selected as the research method, which was guided by the following steps: formulation of the guiding question of research; establishment of inclusion and exclusion criteria for the selection of studies, sampling or search in the literature for the primary studies, which correspond to the original investigations; data extraction; evaluation of the studies included in the review; analysis and synthesis of the results and presentation of the review [7]. The guiding question of the research was "What are the nursing care with the skin of hospitalized newborns available in the literature?"

The search for primary studies was carried out in the Latin American and Caribbean Literature in Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE), Nursing Database (BDENF) and National Library of Medicine National Institutes of Health (PUBMED). For the search, the controlled descriptors were used (Descriptors in Health Sciences - DeCS and Medical Subject Headings - MeSH), in the following combinations: nursing care AND newborn AND skin/nursing care AND newborn AND skin, respectively.

The inclusion criteria were original articles that included the guiding question of the research, published in the English, Portuguese or Spanish languages, between 2005 and 2016. Articles that did not include the guiding question of the research, as well as those repeated among the databases, dissertations, theses, literature reviews, editorials, response letters, research protocols and publications that were not fully available, only summary.

Two of the authors of the present study performed the data collection, independently. Thus, the

search carried out in the databases gave rise to 813 eligible primary studies that, when submitted to inclusion and exclusion criteria, were reduced to the final sample of the review, which included ten primary studies, six from LILACS, two from MEDLINE and two from PUBMED **(Table 1)**.

Despite the exhaustive search for the studies in the described databases, the use of the identified records was reduced due to the lack of availability of some publications relevant to the theme, representing a limitation of this study.

The data extraction was performed through a previously validated data collection instrument, which has five items: study identification; institution of the study; type of scientific journal; methodological characteristics of the study and evaluation of methodological rigor [8].

In the analysis and interpretation of the data, categories were constructed for comparing the contents and grouping the similarities or divergences among the chosen studies. The presentation of the review and the discussion of the data were done in a descriptive way, in order to allow the reader to critically evaluate the obtained results and their applicability.

Results

Among the ten primary studies included in this review, those in Portuguese prevailed, with seven productions (70%), followed by English, with two publications (20%). There was only one study in the Spanish language (10%). In relation to the journals, there was diversity, with a slight emphasis on the *Revista da Rede de Enfermagem do Nordeste* (Journal of the Nursing Network of the Northeast) (20%) and the *Revisa da Escola de Enfermagem da USP* (Journal of Nursing School of USP) (20%), with two publications each. As for the established time cut, the largest number of published studies on the subject occurred in 2008, 2014 and 2015, with two publications each year (60%). There were no corresponding studies for the years 2006, 2007, 2011, 2012 and 2016, as shown in **Table 2**.

Table 1. Number of eligible primary studies and reasons for exclusion in the databases selected for the construction of the integrative review. Teresina, PI, 2016.

Databases	LILACS	MEDLINE	BDENF	PUBMED	Total
Eligible primary studies	32	181	18	582	811
Unavailable primary studies	13	154	9	186	362
Primary studies outside the delimited period	1	1	1	174	177
Studies outside the guiding question	9	24	4	209	246
Literature reviews/ Theses/ Dissertations/ Editorials/ Protocols	3	0	0	10	13
Primary studies repeated among bases	0	0	4	1	5
Included primary studies	6	2	0	2	10

Source: The authors.

Table 2. Characterization of the primary studies included by number (En), year of publication, authorship and language. Teresina, PI, 2016.

En	Year	Journal	Authors	Language
E1	2005	Journal of Perinatology	Cunha MLC, Procianoy RS, 2005.	English
E2	2008	Rev Rene	Rolim KMC, Linhares DC, Rabelo LS, Gurgel EPP, Magalhães FJ, Caetano JÁ, 2008.	Portuguese
E3	2008	Rev Esc Enferm USP	Nepomuceno LMR, Kurcgant P, 2008.	Portuguese
E4	2009	Rev Enferm UERJ	Rolim KMC, Farias CPX, Marques LC, Magalhães FJ, Gurgel EPP, Caetano JÁ, 2009.	Portuguese

En	Year	Journal	Authors	Language
E5	2010	Rev Rene	Rolim KMC, Barbosa RMA, Medeiros RMG, Leite ML, Gurgel EPP, 2010.	Portuguese
E6	2013	Online braz j nurs	Migoto MT, Souza SNDH, Rosseto EG, 2013.	English
E7	2014	Rev Esc Enferm USP	Santos SV, Costa R, 2014.	Portuguese
E8	2014	Rev Latino-Am. Enfermagem	Schardosim JM, Ruschel LM, Motta GCP, Cunha MLC, 2014.	Portuguese
E9	2015	Enfermería Universitaria	Valenzuela SEC, Campos MLG, 2015.	Spanish
E10	2015	Texto Contexto Enferm	Santos SV, Costa R, 2015.	Portuguese

Source: The authors.

These data suggest a reduced number of scientific productions on the subject within the established period, although there is an increasing interest of nursing by the care of the skin of newborns in the identified studies.

Regarding the methodological outline, there is an equivalence of the quantitative approach (50%) and the qualitative approach (50%) in the published publications. **Table 3** presents the distribution by identification number, objectives and the methodological outline used in the studies, which allows a better compression of the review results for the reader.

Next, there is a summary of the results of each primary study included in the review, as previously identified.

The study design of study 1 showed effects of cleaning methods on the skin of neonates hospitalized in a neonatal intensive care unit, in which preterm newborns were randomized into two groups. One group received only water bath and the other,

Table 3. Distribution of primary studies included by number (En), objectives and methodological outline. Teresina, PI, 2016.

En	Objectives	Methodological outline
E1	To evaluate the effect of the bath only with water, and with water and mild soap of neutral pH, on the skin flora of preterm newborns.	Blind randomized clinical trial, with a quantitative approach.
E2	To identify the knowledge of nurses about techniques for prevention of skin lesions in the preterm newborns and to verify the possible used conducts and efficacy in the prevention of skin lesions.	Descriptive observational study, qualitative approach
E3	To propose a training program for nursing personnel based on an indicator of quality of care.	Descriptive, exploratory study, with a quantitative approach
E4	To know the care of the nurse provided to the newborn for the prevention of skin injury.	Descriptive, exploratory study, with qualitative approach
E5	To identify bacterial colonization after the removal of semipermeable membrane from the anterior chest of preterm newborns (PTNBs).	Descriptive, exploratory study, prospective, with a quantitative approach.
E6	To identify the incidence and prevalence of skin lesions in hospitalized neonates, as well as to characterize the raised lesions.	Observational and longitudinal study, with a quantitative approach.
E7	To know, alogn with the nursing team, the necessary care for the treatment of skin lesions in neonates hospitalized in a Neonatal Unit.	Convergent care research, with qualitative approach
E8	To describe the process of cross-cultural adaptation and clinical validation for use, in Brazil, of the Neonatal Skin Condition Score.	Transcultural adaptation study, with a quantitative approach.
E9	To describe the nursing care process based on Roy's Model of Adaptation in newborns with hyperbilirubinemia.	Case study, descriptive, with qualitative approach.
E10	To identify the knowledge of the neonatal nursing team on the prevention of skin lesions in hospitalized newborns.	Convergent-assistance research, with a qualitative approach.

Source: The authors.

bath with neutral soap and water. After collecting swabs from the axilla of the neonates, in order to compare the cutaneous flora between the groups, both baths are effective in reducing skin colonization by gram-positive and gram-negative bacteria in a similar way. Furthermore, bathing should be performed moderately, with a daily recommendation, but with the use of soap only once or twice a week, considering that its routine use may trigger skin dryness, which predisposes to ruptures and risk of future infections [9].

Study 2 demonstrated that, despite the importance of the skin for the survival of preterm newborns, it is, rarely, the focus of attention in neonatal intensive care units, since most of the care focus on other organic systems considered vital. The skin was the main concern only when there were problems such as pyoderma, wounds, dryness, pruritus, edema and color change. Among the identified nursing care for the prevention of lesions in the study, the most mentioned were: maintenance of dry and hygienic skin, change of decubitus, use of hydrocolloids in bony prominences and in the fixation sites of orogastric tubes or orotracheal tubes, protection with transparent film, use of mineral oil for the removal of adhesives, rotation of the oximeter sensors and grouped collection of exams to avoid repetitive punctures [10].

Study 3, also developed in a neonatal unit, with 121 newborns, shows a higher incidence of skin lesions during hospitalization, in which 77% of neonates in the sample developed some type of lesion after admission to the unit, with a incidence rate of 1.9 lesion per newborn. Of the 230 identified lesions, the following frequencies were observed: ecchymosis (50.9%), perineal erythema (28.7%), moniliasis (8.3%), infiltration (3.5%), hematoma, erosion (2.2%), fissure (1.7%), excoriation (0.9%), abscess (0.4%), and impetigo (0.4%). Intravenous therapy associated with most of the identified lesions, and the use of adhesives related to lesions such as erosion and excoriation. The results of this study based on the elaboration of a training proposal for the nursing staff from the studied unit [11].

Study 4 described results similar to study 2, pointing out the main nursing team care for the prevention of skin lesions. The indicated treatments were: change of decubitus every two or three hours, the use of skin protectors based on pectin and methylcellulose in the fixation of electrodes, probes and umbilical catheters and their withdrawal with caution, using cotton soaked in distilled water, saline serum or mineral oil. There was also the use of micropores in minimal amounts and without compression. The use of semipermeable membrane, hydrocolloid and essential fatty acid (EFA) also stood out. It also emphasized the importance of constant surveillance of the skin of newborns [12].

Study 5 described the use of polyurethane semipermeable membrane, as an instrument of nursing care with the skin of premature newborns. The participants of this study received the membrane and were followed for seven days of hospitalization at the NICU, for further evaluation of the resident bacterial flora. Among the results, the study indicated *coagulase-negative Staphylococcus* as the agent with the highest concentration in the sample membranes (42.87%). It is worth mentioning that this type of microorganism relates to severe cases of infections through cutaneous lesions [13].

Thus, study 5 inferred that preterm and low birth weight newborns are more susceptible to developing sepsis due to the immaturity of the epidermal barrier, the high prevalence of skin lesions and the poorly developed immune system, which directly reflects in neonatal morbidity and mortality. The qualification of the team and the imminent elaboration of guidelines for the Nursing Care Systematization were considered essential strategies in the skin care of the newborn [13].

The study design 6 allowed characterizing the main skin lesions present in 40 hospitalized neonates with gestational age between 23 weeks and three days and 41 weeks and three days. In the

sample, there were 195 lesions, being diaper dermatitis (29.7%) the most frequent, followed by bruising and ecchymosis (24.7%). The other identified lesions were adhesive lesions, infiltration, phlebitis, nasal lesion, umbilical granuloma, surgical incision, necrosis and contact dermatitis [14].

The main causes observed in study 6, for the appearance of cutaneous lesions, mostly related to intravenous drug therapy agents (42.1%). The most widely used therapy in this study was the Essential Fatty Acid (EFA), with a frequency of 26.6%, being used in the treatment of lesions caused by adhesive, as well as injuries of another nature, such as nasal lesions, perineal dermatitis, continuity lesions and fissures [14].

In study 7, the authors aimed to know the necessary care for the treatment of skin lesions in neonates hospitalized in neonatal units. Among the care, most interviewed professionals listed the adequate evaluation, the nursing records and the scientific basis in the systematization of the assistance. In relation to the lesions with phlogistic signs, the authors recommended immediate culture exams in order to identify the pathogenic agent and institute the treatment with the appropriate antimicrobial, as early as possible. The study also emphasized the incorporation of new technologies in health and the choice of the ideal coverage for each type of lesion, besides the indication of adhesive dressings based on silicone, polyurethane film, hydrocolloid or hydrogel, as instruments of care with the skin of newborns [15].

Study 7 also suggested the use of scales such as the Milligram Scale of Intravenous Infiltrations and the Thigpen Grading Scale of Intravenous Infiltrations as a resource for evaluation and treatment of lesions caused by intravenous extravasation, which are responsible for most cutaneous injuries in hospitalized neonates [15-16].

Study 8 pointed out the use of scales in care practice as a method for the standardization of neonatal health status assessment and for the standardization of nursing interventions in relation to skin changes in newborns [17-18]. This study carried out the cross-cultural adaptation and clinical validation for the use of the Neonatal Skin Condition Score instrument in Brazil, and pointed out positive results such as the clarity of the instrument and the easiness of application, and it could serve as a tool for the evaluation of skin care of newborns, in the Brazilian reality, helping to improve care practices [18-19]

Study 9 described, through the implementation of the Calista Roy Adaptation Model, the compromise in the level of physiological adaptation in newborns with hyperbilirubinemia. Nurses' care with the skin of these newborns for the maintenance of cutaneous integrity were described from the physiological needs of oxygenation, nutrition, elimination, activity/rest and protection [20].

Study 10 showed that nursing professionals are aware of the peculiarities of the newborn's skin, recognizing the need for care with cutaneous protection, thermal regulation, transepidermal water loss, hygiene, hydration and handling, as well as care with invasive procedures, prevention of pressure injuries, necessary care during venipuncture and fixation of devices, as well as the correct use of antiseptics [21].

Discussion

The analysis of the primary studies included in the review allowed the formation of two categories, described below:

Risk factors for skin lesions in hospitalized newborns and their consequences

The newborns, when submitted to adaptation to the environment after childbirth, develop cutaneous alterations that encompass from physiological mechanisms to permanent conditions, due to serious illnesses. In this period of adaptation, studies point to some risk factors for the development of skin le-

sions, such as immaturity of the immune system and the stratum corneum, which considerably impairs the protective barrier function of the skin against toxic and pathogenic agents [10, 12-15].

Among the major risk factors associated with the appearance of skin lesions in hospitalized newborns are prematurity and weight less than or equal to 1,500 grams. These factors mostly relate to pathological conditions and to the greater need for hospitalization for long periods of time in neonatal intensive care units [10, 12-14].

Newborns hospitalized in intensive care units are more subject to the development of cutaneous injuries due to anatomical and physiological immaturity, as well as the constant need for therapeutic procedures, the use of invasive devices, and the frequent handling of the multiprofessional team [15].

In this context, researches emphasize that adhesives-attached life support devices for continuous monitoring, in addition to intravenous therapy and catheter use, are among the major factors that expose the skin of newborns to lesions, and that it contributes directly to the occurrence of infections and serious complications such as sepsis [9-15].

Lack of skin monitoring, characterized by the absence of detailed physical examination, inadequate registration of skin changes and lack of scientific basis in nursing professionals' conduct stood out as aggravating factors for the development of skin lesions in the studies developed in neonatal care units. This fact suggests a fragmentation of nursing care in neonatology, thus justifying the high incidence of impaired skin integrity diagnoses observed in the research, leading to the occurrence of potentially preventable cutaneous injuries [10-12, 14].

Nursing care to promote the integrity of the skin of hospitalized newborns

In the included studies, the nursing strategies for skin care of hospitalized newborns and promotion of skin integrity that stood out most were: hygiene, lubrication with emollient agents, use of hydrocolloids and transparent film, decubitus changes every two hours, carefully performing phototherapy and invasive procedures [9-15].

The care when fixing devices such as endotracheal tubes, sensors, probes and venous infusion catheters also stood out, in addition to the use of barrier products between the skin and the adhesive, such as hydrocolloids, at the time of attachment to the skin. In addition, limiting the use of these adhesives to what is strictly necessary, and the use of saline serum, distilled water or mineral oil, when removing them, was pointed out as the main prevention of traumatic effects such as skin abrasion, erythema and ulcerations [10-15, 21].

A study for newborns contraindicated the use of silver-sulfadiazine-based creams due to the presence of sulfur in their composition [15]. This compound, for competing with bilirubin to bind to albumin, favors the greater amount of circulating residual bilirubin, and the latter can be absorbed by the blood-brain barrier of neonates, thus representing a potential risk for kernicterus, which consists of a severe complication for the health of newborns, and may even lead to death [15, 20].

The use of neutral soaps during bathing, the application of EFA in each diaper change and the use of topical antifungal agents, according to medical prescription, was essential for the prevention of dermatitis and in the treatment of perineal infections such as moniliasis [14].

The use of Continuous Positive Airway Pressure (CPAP), a nasal device designed to assist in the treatment of problems related to pulmonary immaturity of premature newborns, has been pointed out in the selection, application and proper maintenance of the device, in addition to the use of catheters with gauges smaller than 5 mm during aspiration, in order to reduce the risk of irritation and inflammation of the nasal mucosa [15].

The researches suggested the creation of protocols for standardization of behaviors and implementation of care through the training of nursing

professionals, as well as the use of new health technologies as instruments of care. Such measures become essential to reduce the risks of changes in the interventions of professionals and to reduce the appearance of skin lesions, allowing prioritizing the individualization and humanization of neonatal care [11, 14-15, 18].

Conclusion

In light of the results of this review, nursing care with newborn skin includes actions aimed at maintaining skin integrity and preventing pathological complications inherent to risk factors, such as prematurity, low weight and anatomical and physiological immaturity.

Regarding the implications for professional practice, the researches indicated that adherence to Nursing Care Systematization (NCS), the use of new health technologies and the constant improvement of the team, through qualifications and trainings, contribute to the improvement in the quality of nursing care with the skin of newborns.

According to the design of the included studies, one verifies that the found results offer support for further research on this subject, besides providing a guide for investigation of more effective interventions for prevention and treatment of skin lesions in this clientele.

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