Original Article

TEXTO & CONTEXTO ENFERMAGEM
TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

VALIDATION OF NURSING INTERVENTIONS TO PREVENT SKIN LESIONS IN HOSPITALIZED NEWBORNS

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ABSTRACT

Objective: to determine the content validity of Nursing interventions to prevent skin lesions in hospitalized newborns, with an experts committee.
Method: a content validation methodological research study conducted by means of an online form between April and June 2018. The participants were five nurses from different Brazilian regions, with experience in the neonatal area: two professors, two stomatherapists, and one assistance nurse. The interventions evaluated were constructed based on scientific knowledge, resorting to the literature based on the available evidence, technical manuals and books, in addition to the researchers' experience in care for the newborn. The content was validated in two rounds. First, each intervention and its set were evaluated regarding agreement, using a minimum Committee Agreement Index (CAI) of 80%. Subsequently, a minimum Content Validity Index (CVI) of 0.8 was used to validate the clarity and relevance of the interventions.
Results: a total of 298 interventions were evaluated in the first round, and only eight did not obtain the adequate index. 39 interventions were evaluated in the second round, all reformulated based on the suggestions of the experts committee. Of these, there were eight not validated in the first round, 20 with small changes, and 11 newly elaborated interventions. All the interventions were validated in the second round, totaling 310 validated interventions.
Conclusion: the Nursing interventions proposed were considered valid regarding content, and can be used in the care provided to hospitalized newborns, in order to prevent skin lesions and to contribute with the quality of the assistance provided and with the safety of the neonatal patient.

DESCRIPTORS: Neonatal intensive care units. Newborn. Skin. Neonatal nursing. Nursing care. Validation studies.

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VALIDAÇÃO DE INTERVENÇÕES DE ENFERMAGEM PARA PREVENIR LESÕES DE PELE EM RECÉM-NASCIDOS HOSPITALIZADOS

RESUMO

Objetivo: determinar a validade de conteúdo de intervenções de enfermagem para prevenir lesões de pele em recém-nascidos hospitalizados, com comitê de *experts*.
Método: pesquisa metodológica, de validação de conteúdo, realizada através de formulário online, no período entre abril e junho de 2018. As participantes foram cinco enfermeiras de diferentes regiões do Brasil, com experiência na área neonatal: duas docentes, duas estomaterapeutas e uma assistencial. As intervenções avaliadas foram construídas com base no conhecimento científico, utilizando-se de literatura baseada nas evidências disponíveis, manuais e livros técnicos, além da experiência das pesquisadoras no cuidado ao recém-nascido. O conteúdo foi validado em duas rodadas. Primeiramente, cada intervenção e seu conjunto foram avaliados quanto à concordância, utilizando-se uma Taxa de Concordância de Comitê (TCC) mínima de 80%. Em seguida, foi utilizado o Índice de Validade de Conteúdo (IVC) mínimo de 0,8 para validar a clareza e relevância das intervenções.
Resultados: 298 intervenções foram avaliadas na primeira rodada e apenas oito não obtiveram o índice adequado. Na segunda rodada foram avaliadas 39 intervenções, todas reformuladas com base nas sugestões do comitê de *experts*. Destas, oito não validadas na primeira rodada, 20 com pequenas modificações e 11 novas intervenções elaboradas. Todas as intervenções foram validadas na segunda rodada, totalizando-se com 310 intervenções validadas.
Conclusão: as intervenções de enfermagem propostas foram consideradas válidas quanto ao conteúdo e podem ser utilizadas no cuidado ao recém-nascido internado, a fim de prevenir lesões de pele e contribuir com a qualidade da assistência e com a segurança do paciente neonatal.

DESCRITORES: Unidades de terapia intensiva neonatal. Recém-nascido. Pele. Enfermagem neonatal. Cuidados de enfermagem. Estudos de validação.

VALIDACIÓN DE INTERVENCIONES DE ENFERMERÍA PARA PREVENIR LESIONES CUTÁNEAS EN RECIÉN NACIDOS INTERNADOS

RESUMEN

Objetivo: determinar la validez de contenido de diversas intervenciones de Enfermería para prevenir lesiones cutáneas en recién nacidos internados, por medio de un comité de expertos.
Método: investigación metodológica, de validación de contenido, realizada a través de un formulario en línea entre abril y junio de 2018. Las participantes fueron cinco enfermeras de diferentes regiones de Brasil, con experiencia en el área neonatal: dos docentes, dos estomaterapeutas y una enfermera asistencial. Las intervenciones evaluadas se elaboraron sobre la base del conocimiento científico, recurriendo a literatura basada en las evidencias disponibles, manuales y libros técnicos, además de la experiencia de las investigadoras en la atención al recién nacido. El contenido se evaluó en dos rondas. Primeramente, cada intervención y su conjunto se evaluaron en términos de concordancia, utilizándose un Índice de Concordancia del Comité (ICC) mínimo del 80%. Seguidamente se utilizó un Índice de Validez de Contenido (IVC) mínimo de 0,8 para validar la claridad y la relevancia de las intervenciones.
Resultados: se evaluaron 298 intervenciones en la primera ronda, y solamente ocho no obtuvieron el índice adecuado. En la segunda ronda se evaluaron 39 intervenciones, todas reformuladas sobre la base de las sugerencias del comité de expertos. De ellas, ocho no habían sido validadas en la primera ronda, 20 habían sufrido pequeñas modificaciones, y 11 eran intervenciones nuevas. Todas las intervenciones fueron validadas en la segunda ronda, totalizando 310 intervenciones validadas.
Conclusión: las intervenciones de Enfermería propuestas se consideraron válidas en cuanto a su contenido y pueden ser utilizadas en la atención al recién nacido internado, a fin de prevenir lesiones cutáneas y de contribuir a la calidad de la asistencia y a la seguridad del paciente neonatal.

DESCRIPTORES: Unidades neonatales de cuidados intensivos. Recién nacido. Piel. Enfermería neonatal. Atención de Enfermería. Estudios de validación.

INTRODUCTION

The care provided to the newborn (NB) that is hospitalized in a Neonatal Unit (NU) requires the use of diverse pieces of equipment and devices, frequent handling, as well as the conduction of different procedures, essential measures for life maintenance and health recovery, and which have contributed to the survival of infants with increasingly lower gestational age (GA) and weight.[1] Although this set of care actions can contribute to the treatment of the hospitalized NB, consideration must be given to the risks that the assistance itself can cause, putting safety at risk and triggering a negative impact on the quality of life and development of these infants. The Nursing team plays a fundamental role in care, and of the concerns of this team is related to maintaining skin integrity in the neonate.

The skin is the largest and most active organ of the human body. It is composed of the epidermis and the dermis, two layers that are strongly adhered with each other and rest on subcutaneous tissue. The main function of the epidermis is acting as a protective barrier, preventing transepidermal water loss (TEWL), the absorption of chemical agents and the invasion by microorganisms, as well as contribute to thermo-regulation. The histological development of the skin finishes with a GA of 34 weeks, but its functions keep maturing during the first year of life of the infant.[2] It is for this reason that all the NBs have thin, sensitive and fragile skin with a deficient barrier function, particularities that, together with the need for treatment for life maintenance, use of devices and frequent handling, expose the NBs to lesions and, consequently, to infections.[2]

However, preterm NBs (PTNBs), mainly those with a GA below 34 weeks, present skin with underdeveloped anatomical and physiological characteristics and are more susceptible to developing lesions.[2] The skin lesions which most frequently affect NBs hospitalized in NUs are the following: pressure ulcer related to immobility and to use of devices;[3] lesions related to the use of adhesives; lesions due to the use of chemical substances; thermal lesions; and incontinence-associated dermatitis, among others that can impair skin integrity in the NB.[2]

A number of studies conducted in Brazil show that the incidence of skin lesions in hospitalized NBs is approximately 40.4%, with diaper dermatitis being the most frequent.[4–5] Other lesions standing out are ecchymosis, phlebitis, hematomas and infiltration, caused by puncture and intravenous therapy,[4–5] as well as those caused by the use of adhesives and the pressure ulcers related to the use of a non-invasive ventilation device.[4] More than 70% of the pressure ulcers in NBs and children are related to the use of medical devices, and less than 40% to immobility. These lesions are serious events that cause pain, prolonged hospitalization, and risk of infection, as well as an increase in the hospitalization costs.[6]

The care practices with the NB's skin are started as early as in the delivery room, with the use of measures to prevent TEWL and to favor thermo-regulation. In the NU, the care measures are maintained during the entire hospitalization period. The Nursing team must pay attention to the daily evaluation of the skin; TEWL; thermo-regulation; hygiene and comfort; as well as to handling; conduction of invasive procedures; use of emollients and antiseptics; use and fixation of the devices; removal of adhesives; prevention of lesions due to puncture, overflow, pressure; and, diaper dermatitis.[7] The use of predictive instruments to assess the skin condition and the risk of lesions is fundamental to guide care, and must be included in the care routine; however, there is lack of these instruments for use in the neonatal population. Only the Neonatal Skin Condition Score (NSCS) scale was adapted and validated for use in Brazil.[8]

Despite the importance of preventing skin lesions for the care provided to these patients, and of the nurse's performance in this process, there is still a large knowledge gap. Unfortunately, for being a vulnerable group, few Randomized Clinical Trials (RCTs), mainly related to skin care, are conducted with the neonatal population. The systematic review studies most frequently found in the literature on this topic are related to thermo-regulation,[9] to care with the umbilical cord,[10] and to the use of emollients.[11] However, they still show weaknesses in the recommendation of some practices, not providing solid evidence to support the care provided. It is for this reason that the Nursing interventions are not standardized, often being based on the personal experience of each professional.

In this sense, the Nursing team working in the NU needs to be sensitive enough to develop their work, seeking alternatives that may contribute to risk reduction, safety and quality of life in the neonates. In view of this, standardizing assistance can bring benefits and be an important strategy in the prevention of skin lesion in the NB, while respecting and preserving the individuality and needs of each human being. In order to organize and standardize health care, scientific evidence must be searched, including the evaluation by experts committees.[12] Evidence-based recommendations point to better care practices. Experts are those professionals with ample theoretical and practical experience in a certain subject matter and can contribute to this scenario by sharing their knowledge to improve care.

With experience in studies on care for the NB's skin, the researchers who conducted this study observed that there is scarce solid evidence on this topic, coming from Randomized Clinical Trials or from Observational Studies. In view of this, the need was perceived to elaborate, based on the literature and on the professional experience of the researchers, Nursing interventions to prevent skin lesions in the NB and to validate their content with a committee of experts in the subject matter. Content validation is a process that allows evaluating the quality of the diverse information of an instrument, ensuring that it attains the objectives proposed, is representative and safely used by its target population.[13]

In view of this context, this study aims at answering the following question: which Nursing interventions present evidence of preventing skin lesions in NBs hospitalized in NUs? In this line, the objective of the study was to determine the content validity of Nursing interventions to prevent skin lesions in hospitalized NBs, with an experts committee.

It is worth noting that the term "intervention" is based on Resolution COFEN-358/2009 of the Federal Nursing Council, of 10/15/2009. The interventions that make up this study are focused on the prevention of skin lesions in NBs, seeking solutions to minimize the risks of lesions related to the specific anatomical and physiological conditions of the NB, as well as those associated with the therapy used in the NU.

This study derives from a PhD thesis that had as its objective to develop a decision-support software program. The validated interventions were used as content for this software, contributing to guide care, and providing adequate guidelines to the neonatal nurse regarding the prevention of skin lesions in the hospitalized NB.

METHOD

A validation methodological study with a quantitative approach, with the objective of determining the content validity of Nursing interventions to prevent skin lesions in hospitalized NBs, with an experts committee. The development of this study was based on a previous study.[14]

The content forwarded for validation was constructed based on the results of an integrative literature review, which had the objective of identifying any level of scientific evidence on the care for the prevention of skin lesions in NBs hospitalized in NUs, in publications dated from 2013 to 2018. The integrative review data collection procedure was conducted at two search moments in the literature. The first, in July 2017, and the results of this search, together with a previous research study conducted by the researchers,[7] technical books and manuals by the Brazilian Ministry of Health,[15–16] and the experience of one of the researchers as a neonatal nurse and stomatherapist, supported the elaboration of 298 Nursing interventions to prevent skin lesions in hospitalized NBs, forwarded to the first validation round. The second search was conducted after analyzing the data from the first validation round, took place in June 2018, and supported the reformulation of 39 interventions that proceeded to experts evaluation in the second round.

The selection of the participants who would make up the experts committee was based on intentional non-probabilistic sampling, establishing a minimum of five individuals. The experts were selected through an active search in the Lattes Platform of the National Council for Scientific and Technological Development (CNPq), by using advanced research by subject matter in order to identify Brazilian teacher and/or assistance nurses with expertise in Neonatology care or teaching. The Brazilian Association of Stomatherapy (*Associação Brasileira de Estomaterapia*, SOBEST) was also resorted to, in the search for Stomatherapist nurses with experience in the care of wounds in NBs or children.

The inclusion criteria used to select the experts were performed through a scoring system that considered the degrees, scientific production and experience of the participants in the study area. Each specialist should obtain a minimum score of five points, according to their specialty, including scientific production, training in the area of interest, and time of professional performance. The participants were formally invited through an invitation letter sent by email. After they accepted the invitation, they were also sent the Free and Informed Consent Form (FICF) and the link to access the validation form containing the objective and the guidelines for the evaluation process, as well as the items to be validated. The participants were given 15 days to complete the validation form.

A total of 22 professionals were invited to make up the experts committee. However, only 5 finished the entire validation process and, for this reason, they were included in the study and participated of the two validation rounds. Of the other professionals, nine did not respond to the invitation, two did not accept, four accepted but did not start the validation process, and two started the validation, but did not finish it.

In order to elaborate the content forwarded for validation, a database was structured in spreadsheet format. The content was organized according to the functionalities of the intended software, that is, a bedside evaluation system which could contribute to Nursing Care Systematization (NCS), with planning of the assistance and work organization, with the inclusion of diverse information such as date, time of birth, weight, GA, and clinical and physiological conditions of the neonate, in addition to the treatments and devices in use, might indicate the Nursing diagnoses and suggest interventions to prevent skin lesions in NBs. For this reason, Wanda Horta's Theory of Basic Human Needs[17] was used as the base to design and organize some of the domains, with emphasis on the psychobiological needs, in addition to the specific conditions of the NB and of neonatal care, as they gather the items corresponding to the risk factors for lesions.

Consequently, the domains were related to the need to be evaluated, with those based on the Theory of Basic Human Needs being the following:[17] neurological regulation, oxygenation, hydration, nutrition, thermo-regulation, ambience, therapy, urinary elimination and bowel elimination. The ones related to the specific conditions of the NB were the following: general care and umbilical cord. And those associated with neonatal care were: Neonatal Skin Condition Score (NSCS) scale, route for the therapy, monitoring, and others.

Based on the organization of the domains in the spreadsheet, the items that should be included in each domain (need) were elaborated, such as: in the neurological regulation domain, the items are: alert and active; alert, but little active; sleepy most of the time; and sedated or comatose.

From the construction of the items, the conditions that determine each intervention were elaborated. For example: NB weighing less than 1,000 grams and/or with GA below 30 weeks. The Nursing diagnoses were constructed based on the domains, items and conditions for intervention, such as: risk of pressure ulcer related to physical immobility (domain: neurological regulation; item: sedated or comatose; condition: all the sedated or comatose infants). These were based on NANDA-I,[18] for being the diagnosis classification system most known in the Brazilian Nursing reality. In turn, the diagnoses were not forwarded for validation, as the validation instrument was already quite long.

Finally, based on the domains, items, conditions for intervention and Nursing diagnoses, the Nursing interventions were elaborated, such as: gently clean the perineal region, using some soft cloth soaked in warm water. Each item presented its own set of interventions, and each condition and diagnosis might fit in one or more interventions.

Data collection took place from April to June 2018, in two rounds. In the first round, the validation instrument was elaborated through *JotForm*®, an online tool for the creation of forms and data collection. It was organized in 15 domains, 55 items and 298 Nursing interventions. In the second round, the instrument was elaborated through a *Microsoft Word*® form. It was organized with 39 Nursing interventions: 8 that had not been validated in the first round; 20 that, although validated, suffered slight changes; and 11 newly elaborated interventions, all according to the experts' suggestions.

The way to assess the instrument was based on a previous study,[14] and it was tested by a teacher nurse and by two assistance nurses with knowledge on the neonatal area before being forwarded to the validation committee. In order to calculate and analyze the data of this study, the Committee Agreement Index (CAI) and the Content Validity Index (CVI) were used in all the validation rounds.

In the validation process, the experts evaluated if they agreed with each domain, item and intervention, as well as with the set of interventions in each item, the set of items in each domain, and the set of domains in the instrument. This evaluation was conducted through a selection field with two options: (1) agree and (2) disagree, being verified through the CAI: Agreement percentage (%)=Number of participants who completely agreed (with the domain, item or intervention in question) / Total number of participants X 100. To validate the interventions, a CAI equal to or greater than 80% was considered as cutoff value.

Each Nursing intervention was also evaluated by the experts regarding clarity, through a four-point Lykert-type scale: (1) not clear; (2) somehow clear; (3) clear; and (4) very clear. And also regarding relevance: (1) not relevant; (2) needs major review; (3) needs little review; and (4) relevant. The clarity and relevance of the interventions was calculated through the CVI, where: CVI=Sum of the number of "3" and "4" answers / Total number of answers. A CVI equal to or greater than 0.8 was considered as cutoff value to consider the interventions as clear and relevant. At the end of each domain, item and intervention, there was also a field so that the experts could write comments and/or suggestions about the question they were evaluating. The domains, items and interventions that did not reach a CAI value equal to or greater than 80% were reformulated based on the expert's suggestions and in view of the literature, being forwarded for a new evaluation round to the same experts committee of the first round, also using the same calculation system and cutoff value for data analysis.

The research study met the ethical precepts of Resolution 466/12 of the National Health Council. The participants signed the FICF, with secrecy, anonymity, freedom to participate, and possibility to withdraw at any moment being guaranteed.

RESULTS

The validation committee was made up by five experts: two teacher nurses, two stomatherapist nurses with experience in NBs, and one assistance nurse working in an NU. Their age varied between 30 and 46 years old. Their training time ranged from eight to 19 years and their working time in the area varied from five to 18 years. Regarding geographical location, the participants came from the South, Southeast, Midwest and Northeast Brazilian regions. The score varied between six and eight points. Three experts were PhDs and two were Stomatherapy specialists.

The Nursing diagnoses elaborated were the following: risk of infection; risk of ineffective brain tissue perfusion; risk of deficient liquid volume; risk of hydroelectrolytic imbalance; risk of imbalance in body temperature; risk of hypothermia; risk of impaired skin integrity; risk of pressure ulcer; risk of impaired tissue integrity; risk of lesion; risk of vascular trauma; risk of bleeding; risk of dysfunctional gastrointestinal motility; ineffective thermo-regulation; impaired skin integrity; ineffective peripheral tissue perfusion; and dysfunctional gastrointestinal motility. These were not forwarded for validation to the committee.

In the first round, each participant evaluated 298 Nursing interventions, distributed in 55 items and 15 domains. Chart 1 presents the summary of the interventions for each item and domain evaluated.

Of the 298 Nursing interventions evaluated in the first round, 217 (72.8%) presented a validation Committee Agreement Index (CAI) for clarity and relevance=100%; 60 (20.1%) presented CAI=80%; 28 (9.4%), CVI=0.80 related to clarity; and 22 (7.4%), CVI=0.80 related to relevance. Only eight (2.7%) obtained a CAI and/or CVI value below 80% or 0.80, respectively. Chart 2 below shows the summary of the interventions that were not validated in the first round.

After data analysis in the first evaluation by the committee, the interventions that did not obtain the appropriate score, as well as those with adequate CVI and CAI values which received suggestions from the experts, were reformulated and re-sent for evaluation. In the second round, the participants evaluated 39 Nursing interventions: of the 8 that had not been validated in the first round, one was deleted and 7 were reformulated. Twenty of the interventions that had been evaluated were modified, and 12 new interventions were elaborated according to the experts' suggestions. These were distributed in 17 items and 11 domains. Chart 3 below shows the number and summary of interventions for each item and domain.

Of the 39 Nursing interventions evaluated in the second round, 30 (76.9%) presented CAI=100% and clarity and relevance=1.0. Nine (23.0%) presented CAI=80% and 5 (12.8%) obtained a CVI=0 80 related to relevance. The validated set of 15 domains, 55 items and 310 Nursing interventions was used as content for a software program called *Neonatal Skin Safe*®.

Chart 1 – Domains, items and summary of interventions evaluated by the experts committee: first round. Florianópolis, SC, Brazil, 2018.

Domains	Items (number of interventions)	Summary of the interventions
General Care	Nursing records (01)	Correct and complete records.
	Hand hygiene (01)	Before and after the procedures.
	Use of gloves (01)	Before and after performing procedures.
	Vernix Caseosa (02)	Vernix maintenance/removal.
	Polyethylene bag (03)	Application/Removal time; mode of use.
	Use of antiseptic (05)	Selection and mode of use.
	Exam collection (01)	Time for hemostasis.
	Handling (10)	Minimal handling; skin-to-skin contact; nesting; positive touch; weighing; noise reduction.
	Bath (11)	Type; mode; time; interval; ideal moment.
NSCS*	Safe, erythema, lesion (07)	Skin evaluation interval; use of emollients.
Neurological Regulation	Alert and active (02)	Repositioning in bed; use of special mattresses and protective dressings; evaluation of the skin and of areas at risk for lesion.
	Alert, but little active (03)	
	Sleepy most of the time (06)	
	Sedated/Comatose (06)	
Oxygenation*	O2†/high flow catheter (05)	Use of skin protective barrier (except Tracheal Tube); adequate device size; system fixation and stabilization; fixation exchange; way to remove adhesives; evaluation of at-risk areas.
	CPAP‡ (11)	
	Ventilation: tracheal tube (05)	
	Tracheostomy (06)	
Hydration	Dehydrated (01)	Repositioning; special mattresses; protective dressings; evaluation of the skin and of at-risk areas.
	Presence of edema (05)	
Nutrition	Nasogastric/Jejunal catheter (05)	Skin protective barrier; catheter/tube fixation and stabilization; way to remove adhesives; evaluation of at-risk areas; hygiene of peristomal skin.
	Orogastric/Jejunal catheter (05)	
	Gastrostomy/Jejunostomy tube (06)	
Thermo-regulation	Maintain axillary temperature between: 36.5 and 37.5ºC (04)	Axillary temperature monitoring; measures for thermo-regulation (skin-to-skin contact, use of caps/socks/gloves, avoid air drafts and handling).
	Difficulty in maintaining axillary temperature between: 36.5 and 37.5ºC (05)	
	Therapeutic hypothermia (04)	Rigorous temperature monitoring; repositioning in bed; evaluation of the skin and of areas at risk for lesion; measures that must be avoided for temperature decrease/increase in the newborn.

Chart 1 – Cont.

Domains	Items (number of interventions)	Summary of the interventions
Ambience	Two-walled incubator (08)	Temperature for thermoneutral environment; humidification management (two-walled incubator); handling in the conduction of procedures; moment of transfer to the crib.
	Single-walled incubator (03)	
	Radiant crib (02)	Correct use of the crib.
	Lateral heating in crib (02)	Adequate clothing; moment to turn heating on.
	Simple crib (01)	Use of adequate clothing to maintain normothermia.
Therapy	Antibiotic: OR[§], IM[||], IV[¶] (01)	Care in infusion; adequate venous access; site evaluation during infusion; indications for interruption.
	Sympathomimetic Drugs; hyperosmolar; non-physiological pH (03)	
	Blood/Blood products (04)	
Route for therapy	Injection by SC[**] route (03)	Site and way of administration; maximum volume; rotation and evaluation of the application sites.
	Injection by IM route (05)	
	Peripheral venous access (17)	Care in vessel selection; preparation of the puncture site; type of device; catheter fixation/stabilization; asepsis; exchange of dressing; site evaluation; way to remove adhesives; moment to remove vascular access.
	PICC[††]/Venous dissection (18)	
	VUC[‡‡]/AUC[§§] (19)	
Umbilical cord	Umbilical cord present (10)	Hygiene: antiseptic in alcohol-based solution: use of umbilical catheter; cleaning mode and interval; individualized dispensation of the product.
Monitoring	Temperature sensor (02)	Sites, ways of fixation; sensor rotation; use of cutaneous barrier dressings under the sensor; evaluation of the contact areas; moment and method to remove the electrodes and the fixation adhesives.
	Pulse oxymetry (04)	
	Cardiac monitor (04)	
	Non-invasive pressure (03)	
Urinary Elimination	Diuresis in diaper (07)	Type of diaper; exchange interval; mode and material for hygiene of the diaper area; use of barrier-forming products; site evaluation.
	Bag to collect urine (04)	Mode of use and removal; skin protection.
	Catheter: relief/delay (06)	Catheter caliper; asepsis of the genitalia; fixation.
	Cystostomy (03)	Hygiene; protection of the surrounding area; removal of adhesives.
	Vesicostomy (13)	Selection of the collecting equipment; mode of use; local hygiene; protection of the peristomal area; evaluation of the effluent, of the stoma and of the peristomal skin; emptying of the collecting bag; exchange of the equipment.

Chart 1 – Cont.

Domains	Items (number of interventions)	Summary of the interventions
Bowel Elimination	Normal evacuation/Increase in frequency/ Change in feces' consistency (09)	Type of diaper; exchange interval; mode and material for hygiene of the diaper area; use and selection of barrier-forming products; site evaluation.
	Colostomy/Ileostomy (13)	Selection of the equipment; local hygiene; evaluation and protection of the peristomal area; evaluation of the effluent; emptying of the bag; exchange of the equipment.
Others	Phototerapy (03)	Evaluation of the skin during the treatment.
	Thorax drain (03)	Fixation; exchange of dressing; skin protection; removal of adhesives; evaluation of the areas at risk for lesion.
	Peritoneal dialysis catheter (03)	
	Exudative wounds (04)	Type and moment to exchange dressing; skin protection; removal of adhesives; evaluation of the perilesion area.

*Neonatal Skin Condition Score scale, †Oxygen, ‡Continuous Positive Airway Pressure; §Oral Route, ‖Intramuscular, Intravenous, **Subcutaneous, ††Peripherally Inserted Central Catheter, ‡‡Venous Umbilical Catheter; §§Arterial Umbilical Catheter.

Chart 2 – Number and summary of the interventions that were not validated by the experts in the first evaluation round, according to items and domains. Florianópolis, SC, Brazil, 2018.

Domains	Items (number of interventions)	CAI* < 80%	CVI† < 0.80	Intervention
General Care	Vernix Caseosa (01)	01	–	Remove areas stained with blood.
Oxygenation*	Tracheal tube (01)	01	01 (clarity)	Do not use cutaneous barrier dressing under fixation adhesive.
Umbilical cord	Umbilical cord present (02)	02	–	Use of alcohol-based antiseptic regardless of gestational age.
Monitoring	Pulse oxymetry (01)	01	–	Use of cutaneous barrier dressing under oxymetry sensor.
Urinary Elimination	Diuresis in diaper (02)	02	01 (clarity)	Use of EFA‡ in the perineum; use of products in the newborn undergoing phototherapy.
Bowel Elimination	Normal evacuation (01)	01	01 (clarity)	Use of EFA in the perineum; use of products in the newborn undergoing phototherapy.

*Committee Agreement Index, †Content Validity Index, ‡Essential Fatty Acid.

Chart 3 – Number and summary of the interventions evaluated by the experts in the second evaluation round, according to items and domains. Florianópolis, SC, Brazil, 2018.

Domains	Items (interventions)	Summary of the interventions
General Care	Use of gloves (02)	When to use sterile and non-sterile gloves.
	Vernix Caseosa (02)	When to maintain/remove vernix.
	Polyethylene bag (02)	Care when applying and removing it.
NSCS*	NSCS (02)	Use of emollients according to the score.
Neurological Regulation	Sleepy most of the time (02)	Use of silicon foam dressings for protection and use of pyramidal mattress.
	Sedated or comatose (02)	
Oxygenation*	Invasive ventilation: tracheal tube (02)	More clarity on the non-use of barrier dressing under fixation adhesive.
Hydration	Dehydrated (03)	Associate repositioning to the conduction of procedures; silicon foam for protection; interval for evaluation.
	Presence of edema (03)	
Drug Therapy	Drugs: sympathomimetic Drugs; hyperosmolar; non-physiological pH (01)	Limb positioning so as to ease evaluation during infusion.
	Blood and/or blood products (01)	
Route for therapy	Peripheral venous access (01)	Evaluation frequency.
	Peripherally Inserted Central Catheter/Venous dissection (01)	Circumference of the punctured limb.
Umbilical cord	Umbilical cord present (04)	Selection of the antiseptic according to weight and Gestational Age (water/alcohol-based).
Urinary Elimination	Diuresis in diaper (03)	Use petrolatum- or silicon-based barrier cream in the diaper area. Do not use products under phototherapy.
Bowel Elimination	Evacuation: normal/increase in frequency/change in feces' consistency (03)	Use petrolatum- or silicon-based barrier cream in the diaper area. Do not use products under phototherapy.
Others	Simple/Double/Triple phototherapy (05)	Type; fixation and exchange of eye protector; hygiene and evaluation of the fixation areas.

*Neonatal Skin Condition Score scale.

DISCUSSION

The anatomical or physiological specificities of the skin, associated to the hospitalization in NUs, expose the NBs to a high risk of lesions and infections, mainly PTNBs. It is the nurse's duty, leader of the Nursing team and person responsible for planning the assistance, to search the necessary knowledge to conduct delicate, safe and quality care, in order to contribute to the healthy development of these NBs.[5,7]

With this scenario as a starting point, the need emerged to conduct this study, in order to reduce the number of complications, standardize care, and disseminate the knowledge related to the skin of the hospitalized NBs, considering the risks to which these patients are exposed during their hospitalization. In this sense, it can be used as the basis for the development of a decision-support software program, in order to guide the nurse in the prevention of skin lesions in NBs.

So that an instrument can be used in different regions, it must be adapted to the local specificities regarding language, culture and work of the professionals who will use it.[19] The content validation process had the participation of professionals from different performance areas, which strengthened the evaluation, considering that it allowed for different perspectives and diverse knowledge on the theme in question. In addition to that, the participation of experts from different Brazilian regions favored that the interventions were standardized to the cultural diversity of the country.

This study analyzed the feedback from the experts in the light of the scientific literature, so as to support Nursing interventions that may subsidize care for the skin of NBs in NUs. It is important to emphasize that the specialists' opinions, although presenting a low level of evidence, are often the best evidence available, mainly in relation to a population where there is a limitation to conduct Clinical Studies or Observational Studies.[20] The literature search to support the interventions evidenced scarcity of studies on the theme, as well as of instruments that predict the risk of lesions for use in this population. In this sense, the validation of Nursing interventions by experts contributes to care standardization and to the instrumentalization of the neonatal nurse in directing the practices for the prevention of skin lesions in hospitalized NBs.

The domains and items obtained a CAI=100%, showing the scope of the instrument in relation to the evaluation of the risk of skin lesions in NBs. It is important to emphasize that the experts did not suggest the inclusion of new domains or items. Regarding the Nursing interventions, of the 298 forwarded for evaluation in the first round, only eight did not obtain adequate CAI and/or CVI values. These questions were related to the removal of the Vernix in the areas stained with blood or meconium, to the use of barrier dressing between the skin and the adhesive tape for tracheal tube fixation, to the use of antiseptics in a water-based solution in the umbilical cord of NBs with GA below 30 weeks and weight lower than 1,000 grams, to the use of barrier dressing between the skin and the oxymetry sensor, and to the use of Essential Fatty Acid (EFA) in the diaper area.

After analyzing the experts' suggestions and conducting a new search in the literature, the intervention on the oxymetry sensor was removed, since no support was found in the literature. The interventions on Vernix Caseosa and tracheal tube were better supported and forwarded to the second evaluation round.

The World Health Organization (WHO) recommends that the Vernix Caseosa be preserved intact, as it contributes to the formation of both the cutaneous barrier and the bacterial acid mantle. Only the areas stained with blood and/meconium must be removed, in order to prevent infections.[21]

When using critical care devices, such as tracheal tubes, they must remain strongly fixed. Cutaneous barrier sheet dressings between the skin and the adhesive for tracheal tube fixation can come off and cause accidental extubation. Consequently, the use of cutaneous protectors to form a barrier between the skin and life-sustaining devices, as well as the use of low-adhesiveness tapes, is contraindicated due to the risk of accidental removal of the device, putting patient safety at risk.[22]

The interventions on the use of antiseptics in the umbilical cord and the use of EFA in the diaper area were modified, according to the experts' suggestions and based on the literature, being sent to the second evaluation round.

The hygiene practices for the umbilical cord are important to prevent bacterial colonization and, consequently, infections and death, mainly in PTNBs. The topical use of chlorhexidine prevents sepsis and reduces neonatal mortality.[10] However, alcohol-based solutions can cause lesions such as burns and dermatitis in the skin of PTNBs and of low weight NBs.[23]

The EFAs, like linoleic acid, contribute to modulate the inflammatory and immune responses, and improve skin repair, hydration and permeability.[24] The use of a topical barrier cream with zinc, silicon or petrolatum oxide formulations forms a lipid film on the skin surface, reducing contact with urine and feces, thus repairing the corneal stratum and providing protection against diaper dermatitis.[25]

In the second round, in addition to the seven reformulated questions, another 32 interventions were included, of which 20, although having been validated in the first round, were modified according to the experts' suggestions. These interventions were related to the use of gloves, to the moment to remove the polyethylene bag, to the use of emollients according to the NSCS score,[8] to the measures for the prevention of pressure ulcers, and to the evaluation of venous access.

The use of gloves promotes individual protection to the health professional, reduces contamination of the surgical field, of the mucous membranes or of non-intact skin, as well as it prevents cross-infection.[26] The use of the polyethylene bag in the infant after birth reduces by 30% to 40% the total heat loss, mainly through the reduction of the loss of evaporative water. This will have to be removed when the NB attains thermal stability, as it can cause hyperthermia.[27] Applying emollients helps in the recovery of natural hydrating and moisturizing factors of the skin, contributes to the epidermal barrier function, and can be conducted through the use of EFAs.[25]

Patient repositioning in bed, protection of bone protuberances, and use of a support surface allow reducing the duration and magnitude of the pressure on the vulnerable areas of the body, favoring comfort and reducing the chances of lesions. Frequent skin evaluation helps in the early detection of complications caused by pressure and allows implementing adequate interventions.[28] Lesions due to overflow can cause severe complications, including muscle and tendon lesions, with the need for reconstructive surgery or even limb amputation. Frequent evaluations during the infusion of vesicant or irritant solutions contribute to prevent these lesions.[29]

The experts' opinions play an important role in care in various child health areas, as they allow for the identification of priority care, contribute to planning research studies, collaborate with data analysis, help in the development of assistance models, and cooperate with the use of theory in practice, supporting the professional in decision-making. Consequently, these opinions must be considered.[20]

Among the 39 interventions sent to the second round, 12 were elaborated according to the experts' suggestions, as they were not included in the instrument assessed at the first moment. These interventions were related to the removal of the Vernix Caseosa in NBs exposed to infection by Hepatitis B and/or Human Immunodeficiency Virus (VIH), to the type, size and mode of fixation of the eye protector during phototherapy treatment, and to the evaluation period for the contact sites and time for eye protector exchange.

The experts' concern regarding the inclusion of the aforementioned items is justified because there can be vertical transmission of Hepatitis B and HIV through maternal secretions, reason why the Brazilian Ministry of Health recommends that at-risk infants be bathed within their first hour of life.[16]

Regarding the care measures for the NB during phototherapy treatment, an opaque eye protector must be used, due to the risk of lesion in the retina resulting from the light emitted. In addition to that, its size must be adequate for the baby's weight, due to the risk of generating pressure, when small, or displacement, when large. Eye protectors that do not need adhesive tapes for their fixation must be prioritized, as well as those with a better fit to the NB's head and eyes, in order to avoid lesions when removing the adhesive, due to pressure or displacement.[22,30]

As a result of the second round, all 39 interventions were validated. In view of this, the final instrument was validated with 15 domains, 55 items and 310 interventions. Based on this validation process, it is observed that the instrument contemplated all the data relevant to NB care, regarding the prevention of skin lesions. On the other hand, it is important to note that nurses must use it only as a guide, always resorting to their clinical reasoning, use their decision power and search knowledge, based on the best evidence available, in order to increasingly improve care safety and quality, considering the needs of each neonate.

Neonatal Skin Safe® is an application for mobile devices where the nurse records the NB's birth data and updated weight and starts the evaluation. Each domain is a need to be evaluated and its items are options that must be selected based on the patient's condition. Once the evaluation is finished, the system presents the user only the Nursing diagnoses and interventions related to the items selected in each domain and to the NB's updated data. The "general care" domain is the only exception, since its items are not selected by the nurse. They are based on the weight, CGA and post-natal age data, updated by the system, to select the diagnoses and interventions.

Among the difficulties and limitations of this study, the scarcity of solid evidence on the care for the NB's skin stands out, hindering the construction of the interventions. On the other hand, the validation process by experts committee contributed to the enrichment and scientific quality of the content, thus conferring reliability to the instrument. It is noted that this study brings significant contributions to the Nursing teams working in NUs, since the use of a software program with validated content helps in care standardization, in supporting the Nursing actions related to the prevention of skin lesions, and in the conduction of a safe and good quality assistance practice, with respect to the specifities of the hospitalized NB.

CONCLUSION

The final instrument was validated with 310 interventions, showing that it offers subsidies to instrumentalize the neonatal nurse in directing the care practices for the prevention of skin lesions in NBs. The validated interventions are related to the following: evaluation of the skin condition; body temperature maintenance (skin-to-skin-contact, thermoneutral environment, use of polyethylene bag); reduction of TEWL (humidification of the incubator and use of emollient); delicate handling; care with the umbilical cord; selection of the topical antiseptic; use of emollients; hygiene care measures (bath and personal hygiene); positioning in bed; skin protection; fixation of devices (oxygenation, feeding, vascular and elimination access); drug overflow; removal of adhesives; use of monitors; phototherapy; thorax drain; and stomas.

Developing a software program for the prevention of skin lesions with validated content is an advance for neonatal care, as it is associated to technological innovation on a theme little discussed in the literature. In addition to that, it can be used in the different settings involving Neonatology, be it in the teaching-learning process, in continuing education, in direct assistance to the patient, or in the organization of the nurse's work. Finally, based on the conduction of this study, it is recommended that new research studies be conducted on the theme, in order to consolidate the practices for neonatal assistance.

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NOTES

ORIGIN OF THE ARTICLE

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