Original Article

TEXTO & CONTEXTO ENFERMAGEM
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CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE BRADEN QD SCALE FOR USE WITH NEONATES IN BRAZIL

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ABSTRACT

Objective: to cross-culturally adapt and validate the Braden QD Scale for use with neonates in Brazil.
Method: a methodological study of cross-cultural adaptation and observational cross-sectional validation study, carried out between December 2017 and August 2021. The participants were 10 specialists, 38 nurses and 105 newborns. The cross-cultural adaptation process involved the initial translation, synthesis, back-translation, expert committee, pre-test and approval of the adapted version of the original instrument by the author. Validation verified the validity, reliability and internal consistency psychometric properties, from simultaneous and independent application of the adapted instrument by two evaluators, and based on time evaluation from the video of five neonates at two different moments. The statistical tests performed were Content Validity Index, Cronbach's alpha and Kappa coefficient.
Results: the Braden QD scale translation process resulted in the Portuguese version adapted for the Brazilian culture. The expert committee's Content Validity Index was ≥0.90 and that of the pre-test was ≥0.80. In interobserver reliability, all items obtained Kappa coefficients > 0.90. Cronbach's alpha was 0.773 and 0.769 for Evaluators 1 and 2, respectively, with Cronbach's alpha > 0.6 considered as reliable. In intraobserver agreement, the mean scores were not different in the practice.
Conclusion: the instrument was cross-culturally adapted for use with neonates and children in Brazil. The Brazilian version presented statistical validity and reliability levels, proving to be valid for use in neonates in Brazil.

DESCRIPTORS: Methods. Validation studies. Neonatal nursing. Pediatric nursing. Pressure injury. Risk measurement.

HOW CITED: Santos SV, Silveira JR, Costa R, Batalha LMC, Velho MB. Cross-cultural adaptation and validation of the Braden QD Scale for use with neonates in Brazil. Texto Contexto Enferm [Internet]. 2022 [cited YEAR MONTH DAY]; 31:e20220044. Available from: https://doi.org/10.1590/1980-265X-TCE-2022-0044en

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ADAPTAÇÃO TRANSCULTURAL E VALIDAÇÃO DO INSTRUMENTO *BRADEN QD SCALE* PARA USO EM NEONATOS NO BRASIL

RESUMO

Objetivo: adaptar transculturalmente e validar o instrumento *Braden QD Scale* para uso em neonatos no Brasil.
Método: estudo metodológico de adaptação transcultural e estudo transversal observacional de validação, realizado entre dezembro de 2017 a agosto de 2021. Participaram 10 especialistas, 38 enfermeiros e 105 recém-nascidos. O processo de adaptação transcultural envolveu a tradução inicial, síntese, retrotradução, comitê de especialistas, pré-teste e aprovação da versão adaptada pela autora do instrumento original. A validação verificou as propriedades psicométricas de validade, confiabilidade e consistência interna, a partir da aplicação do instrumento adaptado por dois avaliadores, de forma simultânea e independente, e avaliação temporal a partir de vídeo de cinco neonatos em dois momentos distintos. Os testes estatísticos foram o Índice de Validade de Conteúdo, alfa de Cronbach e coeficiente Kappa.
Resultados: o processo de tradução da *Braden QD Scale* resultou na versão em português adaptada para a cultura brasileira. O índice de validade de conteúdo do comitê de especialistas foi ≥0.90 e do pré-teste foi ≥0.80. Na confiabilidade interobservador todos os itens obtiveram coeficiente Kappa >0,90. O alfa de Cronbach do avaliador 1 foi de 0,773 e do Avaliador 2 foi de 0,769, sendo confiável o alfa de Cronbach >0,6. Na concordância intraobservador a média dos escores, na prática, não foram diferentes.
Conclusão: o instrumento foi adaptado transculturalmente para uso em neonatos e crianças no Brasil. A versão brasileira apresentou níveis estatísticos de validade e confiabilidade, mostrando-se válida para uso em neonatos no Brasil.

DESCRITORES: Métodos. Estudos de validação. Enfermagem neonatal. Enfermagem pediátrica. Lesão por pressão. Medição de riscos.

ADAPTACIÓN TRANSCULTURAL Y VALIDACIÓN DEL INSTRUMENTO *BRADEN QD SCALE* PARA SU USO CON NEONATOS EN BRASIL

RESUMEN

Objetivo: adaptar transculturalmente y validar el instrumento *Braden QD Scale* para su uso con neonatos en Brasil.
Método: estudio metodológico de adaptación transcultural y estudio transversal y observacional de validación, realizados entre diciembre de 2017 y agosto de 2021. Los participantes fueron 10 especialistas, 38 enfermeros y 105 recién nacidos. El proceso de adaptación transcultural abarcó lo siguiente: traducción inicial, síntesis, retrotraducción, comité de especialistas, pre-test y aprobación de la versión adaptada a cargo de la autora del instrumento original. La validación verificó las propiedades psicométricas de validez, confiabilidad y consistencia interna, a partir de la aplicación del instrumento adaptado por parte de dos evaluadores, en forma simultánea e independiente, además de una evaluación temporal a partir de un video de cinco neonatos en dos momentos distintos. Las pruebas estadísticas correspondieron al Índice de Validez de Contenido, Alfa de Cronbach y Coeficiente Kappa.
Resultados: el proceso de traducción de la escala Braden QD tuvo como resultado la versión en portugués adaptada para la cultura de Brasil. El índice de validez de contenido del comité de especialistas fue ≥ 0.90, mientras que el del pre-test fue ≥ 0.80. Al analizar la confiabilidad interobservador, todos los ítems obtuvieron coeficientes Kappa > 0,90. Los valores del Alfa de Cronbach fueron 0,773 y 0,769 para los evaluadores 1 y 2, respectivamente, donde Alfa de Cronbach > 0,6 se considera confiable. Al analizar la concordancia intraobservador, la media de las puntuaciones no difirió en la práctica.
Conclusión: el instrumento fue adaptado transculturalmente para su uso con neonatos y niños en Brasil. La versión brasileña presentó niveles estadísticos de validez y confiabilidad, demostrando así ser válida para su uso con neonatos en Brasil.

DESCRIPTORES: Métodos. Estudios de validación. Enfermería neonatal. Enfermería pediátrica. Lesión por presión. Medición de riesgos.

INTRODUCTION

Actions aimed at protecting the skin are essential in the nurse's work routine, with the objective of preventing injuries. Pressure Injury (PI) stands out with regard to skin lesions acquired mainly in hospitals, conceptualized as damage located on the skin and/or underlying soft tissues, and it can manifest as intact skin or open lesions, resulting from intense and/or prolonged pressure or from the association between pressure and shear, usually occurring over bony prominences or associated with the use of a medical device or other equipment[1–2].

It should be noted that PI is an avoidable event and that it stands out as an indicator of Nursing care quality[3]. Reducing PI risk and incidence is part of the good care practices; therefore, it must be a priority for the health team[4].

PI is an object of concern and constant attention, as the high cost represents a public health problem. In addition to that, it can lead to irreparable physical disorders, in addition to exerting an influence on morbidity and mortality due to its general complications[5]. Studies on PI are important because they make it possible to elucidate the risk factors, the characteristics of the lesions and the prevention and treatment modalities, in order to contribute to reductions in hospitalization times, hospital costs, infection rates and deaths of patients[6–7].

In relation to newborns (NBs), skin integrity contributes to their survival; however, due to often premature birth, this integument is immature, thin and delicate, being easily susceptible to the development of lesions and exposing both the skin and the neonates to the risk of infections[8]. There are differences between the skin of preterm NBs (PTNBs) and term NBs; however, during hospitalization in a Neonatal Unit (NU), all are exposed to risks, including the risk for PI. PI incidence in NBs is approximately 14%, of which more than 60% is related to the use of medical devices and less than 40%, to immobility[9].

In pediatric patients, the PI incidence rate is 21.8%, of which more than 70% is related to immobility and less than 30%, to the use of devices[10]. Among the risk factors are chronic neurological diseases that hinder repositioning, mechanical ventilation, use of vasomotor drugs, and hospitalization for periods longer than one month[10–11].

Nurses' use of instruments to assess the risk of developing PI is an important care strategy, as it provides a foundation for the care practice, contributes to organizing work and guarantees good quality and safe care; however, it must be combined with the professional's clinical reasoning[6,12].

In order to contribute to PI prevention, Dr. Martha Curley, professor at the University of Pennsylvania in the United States, prepared and validated, together with her team, a predictive instrument to assess the risk of PI in patients admitted to intensive care, called "Braden QD Scale."[13] It was designed to correct some flaws in the Braden Q Scale[14], which assesses the risk of PI related to immobility in children aged between 21 days and 8 years old but does not include patients with congenital heart diseases[14]. In contrast, the Braden QD Scale combines an assessment of the risk of PI related to immobility and use of medical devices, encompassing from preterm NBs (PTNBs) to individuals aged 21 years old, with varied clinical conditions, including heart and neurological diseases[13,15].

To the present day, the Braden QD Scale has been cross-culturally adapted into Chinese, Dutch, English, Canadian French, Swiss French, Italian, Korean, Thai, Danish and Finnish, showing that there is worldwide concern among professionals about PI prevention.

Validation of the Braden QD Scale was conducted in a multicenter prospective cohort study with 625 hospitalized children, with ages varying from preterm infants to people aged 21 years old (mean of 6 years old), finding an occurrence of 86 hospital-acquired PIs (86% sensitivity in a cutoff score of 13), with 22 related to immobility and 64 due to use of medical devices, which denotes the high risk of developing PIs in neonatal and pediatric patients[13]. For this reason, nurses must seek instruments that contribute to the prevention of lesions, in order to promote patient safety and care quality.

In this scenario, considering the need to use reliable instruments that can assist in the identification of NBs and children at risk of developing PIs, as well as the fact that the Braden QD scale has not been yet validated for the Brazilian Portuguese language, it was decided to conduct this study with the objective of cross-culturally adapting and validating the Braden QD Scale instrument for use in neonates in Brazil.

METHOD

The study was carried out in two different stages: 1) Methodological study of cross-cultural adaptation of the Braden QD Scale[13], from its original language, American English, to Brazilian Portuguese. This process followed the methodological procedures proposed by Beaton *et al*.[16], seeking to achieve language equivalence between the original and target versions, as well as to guarantee validity of its content in different cultures. 2) Clinical validation, for use in neonates, which consisted in professionals applying the final version in Portuguese in the clinical practice, in order to verify the validity, reliability and internal consistency psychometric properties of the Brazilian version of the Braden QD Scale, through an observational cross-sectional study.

Authorization to carry out the cross-cultural adaptation and validation process was granted by the lead author of the Braden QD Scale via electronic mail in December 2017, when the original study was still in the publication process. The research was approved by the Research Ethics Committee of *Universidade Federal de Santa Catarina*. It complied with the ethical precepts set forth in Resolution 466/12 of the National Health Council. The participants and the NBs' legal guardians signed the Free Informed Consent Form (FICF), as well as the authorization form for use of image. They were assured regarding confidentiality, anonymity, freedom of participation and the possibility of withdrawing at any moment.

For better understanding the method used in this research, details about the original instrument, as well as the cross-cultural adaptation and validation stages, will be presented separately below.

Original instrument

The Braden QD Scale consists of seven subscales, organized into three dimensions. The *intensity and duration of pressure* dimension includes the *mobility* and *sensory perception* items. The tolerance of the skin and supporting structure dimension includes the friction and shear, nutrition and tissue perfusion and oxygenation items. Finally, the medical devices dimension includes the number of medical devices and repositionability/skin protection items[13,15].

With the exception of the subscale related to the number of medical devices, scored according to the number of devices, up to a maximum of 8, all other subscales are scored from 0 to 2, according to the conditions presented by the patient. The total score of the scale can vary between 0 and 20 points, with higher scores denoting greater risk of PI. The original instrument validation study showed 86% sensitivity and 59% specificity[13].

Based on the Braden QD Scale criteria, high risk of injury is considered for total scores greater than or equal to 13 points. Nursing interventions to prevent PI should focus on each subscale that is assigned a score greater than or equal to 1. The assessment regarding the risk of PI should be performed within 24 hours after hospital admission and repeated whenever there is a change in the patient's clinical condition[16]. More severe patients in an acute condition may need more frequent assessments than chronic patients in stable clinical conditions[13,15].

Cross-cultural adaptation

The cross-cultural adaptation process corresponding to the Braden QD Scale took place from July 2018 to January 2020 and was developed in six stages, namely: initial translation; synthesis of

the translations; back-translation; expert committee; pre-test; and sending the adapted version for approval by the author of the original instrument[16].

The initial translation from the original version (American English) of the Braden QD Scale to the target version (Brazilian Portuguese) was performed independently by two bilingual translators (Translator 1 and Translator 2), who had Portuguese as their mother tongue. Translator 1 (T1) was knowledgeable in the health area and was informed about the objectives of the Braden QD Scale and the concepts involved; this provided adaptations from a more clinical perspective, with the possibility of producing a more reliable translation of the instrument[16]. Translator 2 (T2) had no knowledge in the health area and was not informed about the objectives of the Braden QD Scale or the concepts that were being quantified.

In the second stage, a synthesis of the translations was produced, which resulted in a single translation. In this stage, in addition to Translator 1 and Translator 2, one of the researchers was included in the group in order to mediate the discussions about the differences between the translations. This stage gave rise to the first Portuguese version of the Braden QD Scale (T12).

In the back-translation stage, the translated version of the Braden QD Scale (T12) was translated again, this time into the original language (American English), by two independent translators (T3 and T4), bilingual and whose mother tongue is American English, totally blind as to the original version and the concepts of the construct, generating two back-translated versions (BT1 and BT2). The data from the translation, synthesis and back-translation stages were organized in a Microsoft Word® table, and convergence and divergence of words and terms were analyzed.

In the fourth stage, the synthesis version (T12) was submitted to a committee of experts, who analyzed the semantic, idiomatic, cultural and conceptual equivalence of the original instrument, the translations and the back-translations. 10 experts were invited to assemble the committee. With the exception of the four translators, the other participants were intentionally chosen through an active search on the Lattes platform of the National Council for Scientific and Technological Development (CNPq), using advanced research by subject matter, in order to include professionals with knowledge in the neonatal or pediatric area from different Brazilian regions.

The committee included a professor with experience in cross-cultural adaptation of instruments in the neonatal health area; a nurse experienced in skin injuries (stomatherapist) in children; a nurse with experience in Pediatrics; a nurse with experience in Neonatology; a professor in the neonatal area; a professor in the pediatric area; both translators and both back-translators.

Each participant received an explanatory letter with diverse information about the study objective, stages of the cross-cultural adaptation process and guidelines on the evaluation process. The participants also received the documents produced in the previous stages and the committee of experts' review registration form, developed in Microsoft Word®, comprising 33 items for evaluation and containing the following: title of the instrument and all the dimensions with their respective items and scores, as well as guidelines about the risk score. Each item was scored on a Likert-type scale for the equivalence analysis, with four ordinal point options, namely: (1) not at all equivalent; (2) almost equivalent; (3) equivalent; and (4) fully equivalent; in addition to a space for suggestions. This phase gave rise to the pre-final version of the instrument.

The pre-test was carried out in order to verify clarity of the instrument regarding understanding of its items, its words and use and/or choice of the scores. The framework used suggests that the pre-final version of the instrument be applied to 30 to 40 representatives of the target population[16], that is, the hospitalized NBs and children. However, the Braden QD Scale is a measuring instrument with nurses as end users. For this reason, it was decided to carry out the pre-test with this population.

The professionals were intentionally chosen, initially through a search in the CNPq and in Nursing research groups in the Pediatrics and Neonatology areas at the institution where the research

was developed. A total of 34 nurses participated: 19 with experience in Neonatal Care and 15 with experience in Pediatrics. Nurses who had worked in the specific area for at least one year and who were working during the data collection period were included.

The nurses evaluated understanding and clarity of the items, the answers and the difficulties filling out the instrument. The participants received the pre-final version of the instrument and the link to access the pre-final version testing registration form, developed online in Google Forms®, containing 33 items that included the dimensions, items and scores of the instrument, evaluated in the form of a Likert-type scale with the following scoring structure: (1) not clear; (2) unclear; (3) clear; and (4) totally clear. The professionals recorded their impressions regarding each item, as well as doubts and suggestions to improve understanding of the instrument.

The data from the expert committee stage and the pre-test were tabulated in a Microsoft Excel® spreadsheet and analyzed using the Content Validity Index (CVI), where: CVI = Sum of the number of *3* and *4* answers / Total number of answers. 0.90 was considered adequate for the expert committee, and 0.80 for the pre-test. The items that did not reach the desired CVI would be reformulated and sent back for a new evaluation.

In the sixth stage, the final version of the instrument was emailed to Dr. Martha Curley, author of the original instrument, in order to assess whether an adequate translation was achieved.

Clinical validation

The clinical validation stage corresponding to the instrument for use in neonates was carried out through an observational cross-sectional study, conducted between April and August 2021 at two health institutions located in Greater Florianópolis, Santa Catarina, Brazil.

To assess the psychometric properties, it was decided to select 15 subjects for each item of the instrument. As the Scale has seven items, the sample consisted of 105 NBs admitted to a NU. As inclusion criteria, the NBs should be at least 24 hours old; use at least one medical device; and being hospitalized in an intensive care room. NBs with any type of injury at the recruitment moment and neonates with indication not to be resuscitated were excluded.

To characterize the sample, an instrument was developed with questions about the birth and maternal variables. These data were filled in from the patients' medical records. The items that make up the Braden QD Scale were also included as variables of this study, namely: mobility, sensory perception, friction and shear, nutrition, tissue perfusion and oxygenation, number of medical devices, and repositionability/skin protection.

Four nurses were selected to apply the adapted instrument, that is, two from each participating institution (matched pairs). As inclusion criterion, the nurses should have been working at the institution for at least six months. Each nurse received the final adapted instrument and training to apply the research protocol as recommended by the authors of the original instrument[17]. The evaluations were performed by nurses twice a week, simultaneously and independently, starting at the time the NBs were included in the research and ending after their transfer, discharge or death.

To assess interobserver reliability, two nurses evaluated the same NB simultaneously and independently, scoring each of the Braden QD Scale items, the sum of which presents the total score, indicating presence or not of the risk for developing PIs[18,19]. To assess intraobserver reliability (time assessment), five NBs were filmed during the bedside evaluation. The same nurses assessed the NBs at the time of filming (test) and 15 days after the first evaluation (retest)[18–19].

The data were analyzed using descriptive and inferential statistics. The quantitative variables were represented by mean and standard deviation, while the categorical variables were represented by absolute and relative frequency. For each item of the instrument, the agreement percentage and the Kappa coefficient were calculated[20].

The Kappa coefficient was used to verify the evaluators' agreement or reproducibility; it assesses the agreement proportion, which varies from "minus 1" to "plus 1"; the closer to 1, the better the agreement. A minimum agreement of 0.80 was established as acceptance criterion. The total score of the items was calculated by adding the results of each item for each patient.

The comparison between the evaluators was performed using the paired t test. Cronbach's Alpha Coefficient was calculated to assess internal consistency, with an alpha (α) value > 0.6 being considered reliable[21]. The significance level adopted was 0.05. The IBM-SPSS software, version 25, was used.

RESULTS

The Braden QD scale was considered culturally adapted for obtaining a CVI ≥ 0.90 in the first round by the expert committee and a CVI ≥ 0.80 in the pre-test with pediatric and neonatal nurses.

The expert committee participants lived in the South, Southeast, Midwest and Northeast Brazilian regions. They provided suggestions on semantic and structural changes to instrument items, as shown in Chart 1.

After the adjustments, the pre-final version of the instrument advanced to the pre-test, with participation of 34 nurses, distributed in the South, Southeast and North Brazilian regions. They were 19 nurses with neonatal experience; with one PhD, four masters and seven specialists among them. The mean experience in the area was four years. Continuing with 15 nurses with experience in Pediatrics; with four PhDs, three masters and four specialists among them. The mean experience was six years.

Few participants made isolated suggestions. One participant suggested including a minimum, medium and maximum risk scale instead of only the value considered at risk; however, the original instrument does not include different risk levels, reason why the suggestion was not accepted. The final version of the Brazilian instrument, called *Escala Braden QD*, is shown in Chart 2.

Subsequently, the *Escala Braden QD* instrument advanced to the clinical validation process. The participating nurses were aged between 25 and 40 years old, with experience in NU care varying from six months to two years. This stage was developed between April and August 2021, the final sample consisted of 105 newborns and there was no sample loss, totaling 152 bedside evaluations and five video assessments.

Characterization of the NBs who participated in the validation stage was based on the neonatal and obstetric variables, as shown in Table 1.

To evaluate the scale, 152 observations were performed at the bedside and, for each item of Escala Braden QD, the interobserver agreement percentage was calculated (Table 2) using the Kappa coefficient. The total score of the items was calculated, adding the results of each item for each patient.

To assess intraobserver reliability (time assessment), five NBs were filmed during the bedside evaluation. The same nurses assessed the NBs at the time of filming (test) and 15 days after the first evaluation (retest). For each item of *Escala Braden QD*, the agreement percentage (test-retest) was calculated using the Kappa coefficient. The total score of the items was calculated, adding the results of each item for each patient, as shown in Table 3.

A comparison was also performed between the means of the sums of the scale items by evaluator, and the comparison was performed using the paired t test (Table 4).

Cronbach's alpha was calculated to measure internal consistency of the questionnaire items, that is, reliability of the instrument. With Evaluators 1 and 2, the alpha values found were 0.773 and 0.769, respectively. When comparing the mean of the sums of the scale items in the same evaluator at different moments, no differences were found between the measurements performed (Table 5).

Chart 1 - Suggestions made by the expert committee based on the translation and back-translation of the Braden QD Scale. Florianópolis, SC, Brazil, 2019-2020.

Item evaluated	Description/Translation Consensus	Suggestion	Final result	Comment
Sensory perception **0. No deficit**	*Responsivo e não possui déficit sensorial que limita a capacidade de sentir ou comunicar desconforto.*	Write the word "**E**" in capital letters and in bold.	*Responsivo **E** não possui déficit sensorial que limita a capacidade de sentir ou comunicar.*	Request accepted.
Friction and shear	*Fricção: ocorre quando a pele se move contra as superfícies de apoio. Cisalhamento: ocorre quando a pele e a superfície* óssea *adjacente deslizam uma sobre a outra.*	Change the word "*superfícies*" to "*estrutura.*"	*Fricção: ocorre quando a pele se move contra as superfícies de apoio.* *Cisalhamento: ocorre quando a pele e a superfície* óssea *adjacente deslizam uma sobre a outra.*	Not changed due to the definition of friction using the term "surface" in its description.
0. No problem	*Possui força suficiente para se erguer completamente durante um movimento. Mantém boa posição corporal na cama/cadeira o tempo todo. É possível erguer o paciente completamente durante o reposicionamento.*	Change "*boa posição*" to "*posição adequada.*"	*Possui força suficiente para se erguer completamente durante um movimento. Mantém **posição adequada** do corpo na cama/cadeira o tempo todo. É possível levantar o paciente completamente durante o reposicionamento.*	Suggestion accepted.
Nutrition	*Dieta normal para a idade – avaliar o padrão dos* últimos *três dias consecutivos.*	Change "normal" to "usual."	*Dieta **usual** para a idade – avaliar o padrão dos* últimos *três dias consecutivos.*	Suggestion accepted.
0. Adequate	*Dieta normal para a idade, fornecendo uma quantidade adequada de calorias e proteínas para promover o metabolismo e o crescimento.*	Remove comma. Write the word "E" in capital letters and in bold.	*Dieta para a idade fornecendo quantidade adequada de calorias **E** proteínas para promover o metabolismo e o crescimento.*	Suggestion accepted.
Tissue perfusion and oxygenation **0. Adequate**	*Normotenso para a idade, e saturação de oxigênio ≥95%, e nível de hemoglobina normal, e enchimento capilar ≤2 segundos*.	Write the word "E" in capital letters and in bold. Change "*nível de hemoglobina normal*" to "*nível normal de hemoglobina*" Swap terms from feminine to masculine.	*Normotenso para a idade, **E** saturação de oxigênio ≥95%, **E nível normal de hemoglobina**, **E** tempo de enchimento capilar ≤2 segundos.*	Suggestion accepted

Chart 2 - Brazilian version of the Braden QD Scale after cross-cultural adaptation. Florianópolis, SC, Brazil, 2020*.

ESCALA BRADEN QD				
Intensidade e duração da pressão				**Score**
Mobilidade Capacidade de mudar e controlar a posição do corpo de forma independente	**0. Nenhuma limitação** Faz mudanças significativas e frequentes na posição do corpo ou das extremidades de forma independente.	**1. Limitado** Faz pequenas e infrequentes mudanças na posição do corpo ou das extremidades **OU** é incapaz de reposicionar-se de forma independente (inclui crianças jovens demais para rolar).	**2. Completamente imóvel** Não faz nem pequenas mudanças na posição do corpo ou das extremidades de forma independente.	
Percepção sensorial Capacidade de responder significativamente, de acordo com o grau de **desenvolvimento**, ao desconforto relacionado à pressão.	**0. Nenhum déficit** Responsivo **E** não possui déficit sensorial que limita a capacidade de sentir ou comunicar desconforto.	**1. Limitado** Nem sempre consegue comunicar desconforto relacionado à pressão **OU** possui algum déficit sensorial que limita a capacidade de sentir desconforto relacionado à pressão.	**2. Completamente limitado** Não é responsivo devido ao nível de consciência reduzido ou à sedação **OU** possui déficit sensorial que limita a capacidade de sentir desconforto relacionado à pressão na maior parte da superfície do corpo.	
Tolerância da pele e estrutura de suporte				
Fricção e cisalhamento Fricção: ocorre quando a pele se move contra as superfícies de apoio. Cisalhamento: ocorre quando a pele e a superfície óssea adjacente deslizam uma sobre a outra.	**0. Nenhum problema** Possui força suficiente para se erguer completamente durante um movimento. Mantém posição adequada do corpo na cama/cadeira o tempo todo. É possível levantar o paciente completamente durante o reposicionamento.	**1. Problema potencial** Requer **pouca** assistência para se mover. Desliza ocasionalmente na cama/cadeira, exigindo reposicionamento. Durante o reposicionamento, a pele geralmente desliza contra a superfície.	**2. Problema** Requer assistência **total** ao se mover. Desliza com frequência e exige reposicionamento. É impossível levantar o paciente totalmente sem que a pele deslize contra a superfície **OU** espasticidade, contraturas, prurido ou agitação causa fricção quase constante.	
Nutrição Dieta usual para a idade – avaliar o padrão dos últimos três dias consecutivos.	**0. Adequada** Dieta para a idade fornecendo quantidade **adequada** de calorias **E** proteínas para promover o metabolismo e o crescimento.	**1. Limitada** Dieta para a idade fornecendo quantidade **inadequada** de calorias **OU** de proteínas para promover o metabolismo e o crescimento **OU** recebendo nutrição suplementar em qualquer momento do dia.	**2. Pobre** Dieta para a idade fornecendo quantidade **inadequada** de calorias **E** proteínas para promover o metabolismo e o crescimento.	
Perfusão tecidual e oxigenação	**0. Adequada** Normotenso para a idade, **E** saturação de oxigênio ≥95%, **E** nível normal de hemoglobina, **E** tempo de enchimento capilar ≤2 segundos.	**1. Problema potencial** Normotenso para a idade **com** saturação de oxigênio <95% **OU** nível de hemoglobina <10 g/dl **OU** tempo de enchimento capilar >2 segundos.	**2. Comprometida** Hipotenso para a idade **OU** hemodinamicamente instável ao mudar de posição.	
Dispositivos médicos				
Número de dispositivos médicos	**Marque 1 ponto para cada dispositivo médico* - até 8 (máximo 8 pontos).**			
Reposicionabilidade/ proteção da pele	**0. Nenhum dispositivo médico**	**1. Problema potencial** Todos os dispositivos médicos podem ser reposicionados **OU** a pele sob cada dispositivo está protegida.	**2. Problema** Um ou mais dispositivos médicos **não podem** ser reposicionados **OU** a pele sob o dispositivo **não** está protegida.	
			Total: **(Score total ≥ 13: paciente considerado em risco)**	

*Qualquer dispositivo diagnóstico ou terapêutico que esteja fixado/conectado **ou** que atravessa a pele ou a membrana mucosa do paciente.
Nota: Os pacientes são pontuados em cada uma das 7 subescalas. As pontuações das subescalas são então somadas. A pontuação total ≥13 identifica pacientes em risco de lesão por pressão adquirida no hospital. O risco do paciente é avaliado 24 horas após a internação hospitalar e repetido com alterações na condição do paciente. Intervenções para gerenciar o risco são direcionadas para as subescalas com pontuação ≥1.

*Adapted with permission from Prof. Dr. Martha Curley, University of Pennsylvania School of Nursing.

Table 1 - Characterization of the newborns in the clinical validation of *Escala Braden QD*, Florianópolis, SC, Brazil, 2021. (n=105)

Variables		n (%)	
Gender	Male	53 (50.5)	
	Female	52 (49.5)	
Delivery type	C-section	77 (73.3)	
	Vaginal delivery	28 (26.7)	
Indication for C-section	Fetal distress	27 (25.7)	
	Pelvic presentation	11 (10.5)	
	Hypertensive syndrome	10 (9.5)	
	Placental abruption	6 (5.7)	
	Twins	6 (5.7)	
	Gestational Diabetes Mellitus/Macrosomia	3 (2.9)	
	Malformation	2 (1.9)	
	Elective	2 (1.9)	
	Premature labor	2 (1.9)	
	COVID	2 (1.9)	
	Iterativity	1 (1)	
	Infectious disease	1 (1)	
Diagnoses	Prematurity	55 (52.4)	
	Pulmonary	27 (25.7)	
	Others	10 (9.5)	
	Neurological	5 (4.8)	
	Cardiovascular	4 (3.8)	
	Prematurity and pulmonary	3 (2.9)	
	Musculoskeletal	1 (1.0)	
	Mean (SD†)	**P50‡ [P25; P75]**	**Min - Max**
Weight	2,238.8 (993.3)	2,100 [1,580;2,720]	480 - 4,600
GA* by ultrasound, in weeks	34.1 (4.0)	34 [32; 37]	23 - 41
GA by Capurro, in weeks	33.6 (5.9)	34 [32; 37]	2 - 41

*GA = Gestational Age; †SD = Standard Deviation; ‡P50 = Quartile range.

Table 2 - Interobserver agreement analysis of the newborns in the clinical validation of *Escala Braden QD*. Florianópolis, SC, Brazil, 2021. (n=152)

	Agreement n (%)	Disagreement n (%)	Kappa
Mobility	152 (100)	0 (0)	1.000
Perception	147 (96.7)	5 (3.3)	0.839
Friction	150 (98.7)	2 (1.3)	0,964
Nutrition	144 (94.7)	8 (5.3)	0.907
Perfusion	146 (96.1)	6 (3.9)	0.921
Number	151 (99.3)	1 (0.6)	0.992
Reposition	152 (100)	0 (0)	1.000
Risk	145 (96.7)	5 (3.3)	0.882

*Agreement Analysis – Kappa Index

Table 3 - Intraobserver agreement analysis of the newborns in the clinical validation of *Escala* Braden QD. Florianópolis, SC, Brazil, 2021. (n=5)

	Evaluator 1 (test-retest)			Evaluator 2 (test-retest)		
	Agreement	Disagreement	Kappa	Agreement	Disagreement	Kappa
	n (%)	n (%)		n (%)	n (%)	
Mobility	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Perception	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Friction	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Nutrition	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Perfusion	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Number	3 (60)	2 (40)	0.444	4 (80)	1 (20)	0.688
Reposition	5 (100)	0 (0)	–	5 (100)	0 (0)	–
Risk	4 (80)	1 (20)	–	4 (80)	1 (20)	–

*Agreement Analysis – Kappa Index

Table 4 - Comparison of the evaluators' means in the sums of the scale items. Florianópolis, SC, Brazil, 2021. (n=152)

Evaluator 1	Evaluator 2	Dif* (SD†)	r‡ (p)	p-value§
Mean (SD)	Mean (SD)			
9.66 (3.05)	9.69 (3.04)	0.033 (0.389)	0.992 (<0.001)	0.299

*Dif = Difference between the evaluators; †SD = Standard Deviation; ‡r = Pearson's correlation; §Paired t test.

Table 5 - Comparison of the evaluators' means in the sums of the questionnaire items. Florianópolis, SC, Brazil, 2021. (n=5)

	Test	Retest	Dif† (SD‡)	r§ (p)	p‖
	Mean (SD)	Mean (SD)			
Evaluator 1	10.4 (1.82)	10.8 (1.92)	0.4 (0.548)	0.959 (<0.001)	0.178
Evaluator 2	10.4 (1.82)	10.6 (2.07)	0.2 (0.447)	0.982 (0.003)	0.374

*Same Evaluator - Different times; †Dif = Difference between the evaluators; ‡SD = Standard Deviation; §r = Pearson's correlation; || p = p-value as per the paired t test.

DISCUSSION

PIs have been a concern for Nursing teams around the world for a long time. Although some professionals believe that NBs and children are not at risk of developing PIs, they are indeed vulnerable, either due to prematurity or to the skin's anatomical and physiological characteristics, especially when requiring intensive care, where there is a greater need to use medical devices. In addition to that, this population segment is unable to communicate pain or discomfort caused by pressure[22].

A research study carried out in a Neonatal Unit (NU) of a public hospital in Brazil with a population of 85 NBs showed that 62 (72.9%) developed PIs on the skin or mucosa, related to the use of medical devices[23]. A number of research studies also evidence that the greater the number of devices, the greater the chance of developing PIs[23–24], denoting the need to implement measures to prevent these injuries. With regard to PI, the use of predictive instruments is the gold standard in care.

Considering the skin lesion predictive instruments available to assess NBs and children in Brazil, few were elaborated and/or adapted and validated. Currently, there are only three tools available, namely: the Braden Q Scale adapted and validated in 2011[25], already mentioned in this article; the NB Skin Condition Scale (*Escala de Condição da Pele do RN*, ECPRN) adapted and validated in 2014[26], which assesses dryness, erythema and skin lesions in neonates, not including older children; and the Braden Q Neonatal/Infant Scale adapted and validated in 2016[27], which assesses the risk of PI in neonates.

Although the aforementioned instruments help to assess the risk of skin injury in neonates and/or children, none of them includes an important risk factor, that is, the use of medical devices, essential for health care, which, on the other hand, is already configured as one of the major villains for the development of PI in this population segment. It is noteworthy that, combined with physiological conditions, the devices for oxygenation, feeding, monitoring, therapy and elimination, such as nasal prongs, endotracheal tubes, vascular catheters, electrodes and feeding and elimination catheters, predispose to the occurrence of skin injuries[22,28].

In this perspective, the importance of developing studies that may contribute to changing this scenario is reinforced, in order to equip nurses for the prevention of PIs in the neonatal and pediatric population. The psychometric properties described in the Braden QD Scale take into account several aspects that permeate hospitalization of the neonatal and pediatric population and adapt to the evaluative needs that enable better Nursing care. In this sense, the cross-cultural adaptation of the Braden QD Scale meets this need.

The cross-cultural adaptation of the Braden QD Scale followed a rigorous method, seeking to obtain semantic, idiomatic, cultural and conceptual equivalence between the original version and the new version, called *Escala Braden QD*, as well as to assess its clarity and understanding, in order to ensure that the instrument is fully adapted for use throughout the Brazilian territory.

Cross-cultural adaptation processes for health instruments are thoughtful procedures, consisting of stages that consider textual and technical aspects that corroborate health care instrumentalization[29]. The evaluation carried out by the committee of experts, including participants from different Brazilian regions, ensured that the instrument reached the necessary textual equivalence, so that it could be used by Nursing professionals.

In research studies involving evaluation by expert committees, the participation of professionals from different Brazilian regions provides multiple views on the topic in question, allowing the terms to be standardized to meet the cultural diversity of the country, thus providing reliability to the instrument[30].

The suggestions made by the participants helped to improve the pre-final version, which advanced to the pre-test. The terms "*support surface*" and "*medical devices*" are found in internationally recognized guidelines for PI prevention and treatment, which have already been translated and are used in Brazil[31]. For this reason, the researchers chose not to modify them. In the pre-test stage, based on the CVI obtained and on the few suggestions presented, clarity and understanding of the instrument items were evidenced, without textual or structural changes, confirming the final version of *Escala* Braden *QD*.

The clinical validation stage was applied to a sample of 105 NBs, not finding any statistical difference in the population that comprised this study in regard to gender. Most of the births were through C-sections (73.3%), due to fetal distress (25.7%). Gestational Age (GA) varied between 23 and 42 weeks. The main reason for hospitalization was prematurity (52.4%), followed by respiratory disorders (25.7%).

This stage showed that *Escala Braden QD* was easy to apply by nurses during bedside evaluation of the NBs, noticing high agreement level. The lowest agreement percentage between the evaluators was 94.9% in the Nutrition item, that is, there was disagreement in only eight of the

152 evaluations carried out in this item. Kappa for this assessment was 0.910. In the mobility and repositioning item, the evaluators reached maximum agreement (100% of the evaluations), Kappa index = 1. The literature recommends that values below 0.4 are considered as low reliability, from 0.4 to 0.75 as fair or good reliability, and values above 0.75 as excellent reliability[32]. Most of the items evaluated reached Kappa values > 90%. This is probably due to the fact that the neonatal population has very specific physical and clinical characteristics, which facilitate its evaluation.

In terms of the final score, no significant difference was found between the evaluators (p=0.299). A negligible difference between the evaluators was found (difference = 0.032). Cronbach's alpha values of 0.773 and 0.769 were found with Evaluators 1 and 2, respectively, which corresponds to existence of internal consistency. A study carried out in Indonesia with 51 pediatric patients, which tested validity and reliability of the Braden QD Scale, considered Cronbach's alpha (α) > 0.6 as reliable[21].

On the other hand, intraobserver agreement, even in the same evaluator at different times, only showed different cases between the moments in the "number of devices" item and, consequently, in "risk". The mean scores in the practice were not different, both statistically and in the clinical practice. However, this divergence in the item related to the number of devices draws the attention, understanding that this is an objective question and that it could not generate any doubt. However, we attribute this difference to the fact that the first evaluation was carried out in person, during recording of the video, and the second was performed through the video.

Another issue to be considered is related to the impossibility of evaluating the video in a reserved place and where the professionals could fully devote to the analysis, as this assessment took place at the moment when the nurses were on duty at the NU. There may also have been some quality failure in relation to footage of the NB.

It is noteworthy that, as responsible for care, nurses must be able to provide adequate care and recognize potential characteristics or agents that can cause harm to the patient. In this case, dealing with the neonatal population, which has well-defined characteristics, they must be the differential between care provided correctly and a patient free from preventable injuries. In this perspective, considering that skin integrity evaluation and maintenance is one of the nurses' main responsibilities and should be a priority in their daily practice[33].

Taking into account that the Braden QD Scale encompasses from PTNBs to 21-year-olds, this study brings contributions to the Health and Nursing areas, as it equips nurses for the early identification of patients at risk of developing PIs, providing subsidies for the planning of treatment prevention and strategies.

As a limitation of this study, the following stands out in the cross-cultural adaptation process: the difficulty recruiting participants for data collection, observed by the refusal of researchers to participate in the pre-test stage, with the resulting need to increase the number of invitations to obtain a sample that represented the entire country. In the validation stage, the fact that the retest was only performed in a single health institution stands out, as well as the NBs having already been evaluated at the bedside by the same evaluators, which could cause memory bias; however, due to the large number of samples and the high turnover of patients in the NU, it is believed that this fact did not interfere with the evaluations.

CONCLUSION

The Portuguese version of the Braden QD Scale was considered cross-culturally adapted for use in neonatal and pediatric patients in Brazil, it was validated for use in the care provided to neonates admitted to a NU in this country, and can be used safely, aiming to contribute to PI prevention, for monitoring care quality and patient safety, as well as allowing allocation of resources for this purpose

and guiding actions aimed at reducing the health care risks for each patient. Considering that this instrument is equivalent to the original one, international research studies can be undertaken, in order to compare the results.

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NOTES

ORIGIN OF THE ARTICLE

Extracted from the dissertation - Cross-cultural adaptation and clinical validation of the Braden QD Scale instrument for use in neonates in Brazil, presented at the Graduate Program in Nursing, *Universidade Federal de Santa Catarina,* in 2021.

CONTRIBUTION OF AUTHORITY

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FUNDING INFORMATION

The current paper was carried out with the support of *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* - Brazil (CAPES) - Funding Code 001.

APPROVAL OF ETHICS COMMITTEE IN RESEARCH

Approved by the Ethics Committee in Research of the *Universidade Federal de Santa Catarina*, opinion No.3,321,779/2019 and No.4,581,040/2021, Certificate of Presentation for Ethical Appreciation 11413019.5.0000.0121.

CONFLICT OF INTEREST

There is no conflict of interest.

EDITORS

Associated Editors: Clemente Neves de Sousa, Ana Izabel Jatobá de Souza.
Editor-in-chief: Roberta Costa.

HISTORICAL

Received: February 09, 2022.
Approved: May 23, 2022.

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