Validação e Categorização da Escala de Crenças dos Pais de Recém-nascidos Prematuros

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Resumo

A hospitalização do recém-nascido prematuro em uma Unidade de Terapia Intensiva Neonatal é uma fonte significativa de estresse materno, devido a fatores que interferem na interação mãe-bebê e abalam a dinâmica familiar, alterando o papel parental e interferindo na capacidade de cuidado dos pais. Nesse sentido, este estudo objetivou descrever o processo de tradução, adaptação cultural, validação psicométrica e categorização dos escores da escala Neonatal Intensive Care Unit: Parental Belief Scale (NICU: PBS) para o português do Brasil, com pais de crianças prematuras hospitalizadas. Estudo metodológico de validação com as etapas: tradução, retrotradução, análise do comitê de juízes, pré-teste, reexame das pontuações e avaliação das propriedades psicométricas. A validade de construto foi verificada em uma amostra total de 99 pais de recém-nascidos prematuros, pela análise fatorial confirmatória e exploratória. A validade de conteúdo realizada pelo comitê de juízes mostrou-se adequada, com concordância para tradução de 90 % e Kappa de .71. O teste-reteste obteve Coeficiente de Correlação Intraclasse de .98 e Alfa de Cronbach de .92. Abrangeu-se na análise fatorial exploratória estrutura com três fatores que explicaram 56 % da variância: confiança no papel parental; interação pais e filho, e conhecimento dos pais. A escala de crenças dos pais conquistou validade de conteúdo e confiabilidade satisfatória, além de se apresentar adequada para a aplicação com pais de recém-nascidos prematuros hospitalizados.
Palavras-chave: Unidades de Terapia Intensiva Neonatal, estudos de validação, prematuro, relações pais-filho, cuidado da criança.

Validación y clasificación de la Escala de Creencias de los Padres de recién nacidos prematuros

Resumen

La hospitalización del recién nacido prematuro en una unidad de cuidados intensivos neonatales es una importante fuente de estrés materno debido a factores que interfieren en la interacción madre-bebé y que sacuden la dinámica familiar al alterar el rol de los padres e interferir en la capacidad de atención de los mismos. Este estudio busca describir el proceso de clasificación de las puntuaciones de la escala *Neonatal Intensive Care Unit: Parental Belief Scale (NICU: PBS)*, y su traducción, adaptación cultural y validación psicométrica para el portugués de Brasil con padres de niños prematuros hospitalizados. El estudio metodológico de validación contó con los pasos de traducción, retrotraducción, análisis del comité de los jueces, prueba piloto, revisión de las puntuaciones y evaluación de las propiedades psicométricas. La validez de constructo se comprobó con el análisis factorial exploratorio y confirmatorio en una muestra total de 99 padres de recién nacidos prematuros. La validez de contenido realizado por el comité de jueces fue adecuada, con una concordancia para la traducción del 90 % y un *Kappa* de .71. El test-retest obtuvo un Coeficiente de Correlación Intraclase de .98 y un alfa de Cronbach de .92. Finalmente, en el análisis factorial exploratorio se encontró una estructura con tres factores: confianza en el rol parental, interacción padres e hijos, y conocimiento de los padres; los cuales explicaron el 56 % de la varianza total. En conclusión, la escala de creencias de los padres obtuvo una validez de contenido y confiabilidad satisfactorias, lo que demuestra que su aplicación con padres y madres de recién nacidos prematuros hospitalizados en Brasil es adecuada.
Palabras clave: Unidades de cuidado intensivo neonatal, estudios de validación, prematuro, relaciones padres e hijos, cuidado del niño.

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Validation and categorization of the Parental Belief Scale of pre-term newborn babies

Abstract

Hospitalization of the premature newborn baby in a Neonatal Intensive Care Unit is a significant source of maternal stress, due to factors that interfere with the mother-infant interaction and affect the family dynamics, altering the parental role and interfering with the parental care capacity. This study aimed to describe the process of translation, cultural adaptation, psychometric validation and categorization of the scores of the Neonatal Intensive Care Unit: Parental Belief Scale (NICU: PBS) for Brazilian Portuguese, with parents of hospitalized premature children. This is a methodological validation study with the following steps: translation, back-translation, analysis of the judges committee, pre-test, reexamination of scores and evaluation of psychometric properties. The construct validity was verified in a total sample of 99 fathers and/or mothers of preterm infants by confirmatory and exploratory factorial analysis. The content validity performed by the judges' committee was adequate, with 90 % agreement for the translation and Kappa of .71. The test-retest obtained an Intraclass Correlation Coefficient of .98 and Cronbach's Alpha of .92. In the exploratory factor analysis a structure with three factors was found: trust in the parental role, parent-child interaction and parental knowledge, which explained 56 % of the variance. The parents' Beliefs Scale obtained satisfactory content and reliability, and it was adequate for the application with parents of hospitalized pre-term infants.

Key words: Neonatal intensive care units, validation studies, prematurity, parents-child relationships, child care.

INTRODUCTION

Annually, about 2.8 million babies die in the first 28 days of life, with complications of prematurity being the leading cause, accounting for 35% of deaths worldwide (United Nations [UN], 2015). In Brazil, the prevalence of preterm birth is estimated at 12.5 % (Brazil, 2015), a percentage that is representative of low-income countries (World Health Organization [WHO], 2012). Premature Newborn (PTNB) babies due to their biological vulnerability is predisposed to morbidities during hospitalization and in the growth and development course (Einspieler, Bos, Libertus, & Marschik, 2016; Forcada-Gaux, Borghini, Pierrehumbert, Ansermet, & Muller-Nix, 2011).

The preterm birth, then, in addition to complications for PTNB, constitutes a very stressful situation for parents (Brett, Staniszewska, Newburn, Jones, & Taylor, 2011; Korja, Latva, & Lehtonen, 2012). The feeling of happiness by the gestation and great birth expectations are changed into a situation of concern and anxiety, when facing the babies' hospitalization, which generates a disorder of their feelings (Martins & Oliveira, 2010). This condition can change the parental role and influence the main caregivers' self-confidence (Montirosso, Provenzi, Calciolari, & Borgatti, 2012).

Identifying parents' perceptions about prematurity is an essential element in planning actions that empower them, stimulating the development of healthy parental competence. In this sense, specific tools can be used to measure these beliefs and perceptions of the parents about the lived experiences. However, in Brazil, no references were found in the literature about instruments developed or validated in Portuguese to be used in order to assess the paternal and maternal beliefs in the environment of the Neonatal Intensive Care Unit (NICU).

The Neonatal Intensive Care Unit Parental Belief Scale - NICU: PBS developed by Melnyk, Oswalt, and Sidora-Arcoleo (2014) was validated in the United States, used to identify beliefs, parental care, and to positively assist care developed by the health team in the hospitalization and discharge to the premature child's home.

In this context, this study proposal and the choice of the NICU: PBS, hereafter called the Parents' Beliefs Scale of pre-term newborn babies (NICU: PBS), emerged to be culturally adapted and validated for Brazilian Portuguese.

The validation of the NICU: PBS scale will allow health professionals to use it in an objective way to evaluate the parents' beliefs regarding the hospitalization of the children in the NICU and use this information to prepare the child care, stimulating parental competence. This scale is considered a low-cost measure, fast and easily accessible to identify parents who are at risk of stress (Melnyk et al., 2014). The data indicated in the scale sustain the health team's assertive actions, such as, supportive interventions, parents and family preparation to the neonate care and interaction, especially in the home discharge situation, providing quality of life improvement of the involved individuals and better conditions for the children's growth and development.

In this sense, the present study aimed to describe the process of translation, cultural adaptation, psychometric validation and categorization of the scores of the Neonatal Intensive Care Unit: Parental Belief Scale (NICU: PBS) for Brazilian Portuguese, with parents of premature children hospitalized.

METHOD

Participants

This methodological study was carried out in the NICU and the Intermediate Care Unit (ICU) of a public and teaching hospital in the western region of Paraná state, which exclusively serves the Brazilian Unified Health System.

Participants in the study were fathers and/or mothers of PTNB hospitalized at the NICU and ICU, chosen according to the following inclusion criteria: a) father and/or mother of preterm infants born under 37-week-gestational-age; B) in the case of the participant being under 18 years old should be accompanied by a responsible person; C) to be referred as literate; D) to have Portuguese as their first usual language; E) to have visited their child at least once before applying the instrument. And as criteria of exclusion: a) to report emotional and physical incapacity conditions to answer the instrument (Araújo & Rodrigues, 2010); B) to mention the use of medications for anxiety disorders (Boykova & Kenner, 2012); C) mothers caring for shelter children who were given for adoption (Korja, Latva, & Lehtonen, 2012).

The participants sample varied according to each step of the research. There were 23 fathers and/or mothers, for the test-retest and 76 fathers and/or mothers for clinical validation. The sample size for the clinical validation was calculated using the GPower 3.1.9.2 program, assuming a rho2 value of .3 in the alternative hypothesis, with 18 predictor variables and statistical power of .89, family of tests F, considering α of .05. The total sample of the NICU: PBS scale was therefore composed of 99 fathers and/or mothers.

Among the participants, 62 fathers and/or mothers were linked to the NICU and 37 to the ICU. The scale was answered by 87 (87.8 %) mothers and 12 (12.2 %) fathers, whose the average age was 26 years old, ranging from 16 to 46 years old, characterizing them as young adults. As for schooling, 41 (41.4 %) had completed high school, followed by 21 (21.2 %) with incomplete secondary educational level, ranging from 16 (16.1 %) incomplete elementary school to six (6.1 %) parents with complete higher educational level.

Instruments

The original NICU: PBS instrument was validated in a population of 245 mothers and 143 fathers, age ranging between 18-43 years old for mothers and 18-49 for fathers, as well as the university degree varied from 85 % to mothers and 89 % to fathers. Psychometric data revealed high reliability with Cronbach's alpha ranging from .90 to .93 and test-retest correlations .84 to .94, a three-factor solution was found for the instrument (Melnyk et al., 2014).

The ECP: NICU scale was evidenced as important for using in Brazil, since there are no instruments like this, other than in the English language, both of them to support researches in the neonatal area, and to be used by the health team care in the NICU. Based on the interest, the researchers contacted the scale author Dr[a]. Bernardette Mazurek Melnyk, in the United States of America, by e-mail and obtained authorization for validation in Brazil.

This scale is used with fathers and/or mothers of premature babies hospitalized in the NICU, making it possible to verify the role of the parents' self-confidence, the interaction between parents and children and the knowledge about the NICU. It consists of 18 items, with five points Likert responses ranging from one (totally disagree) to five (totally agree), arranged in the self-applied form, where the total sum of the items leads to a value between 18 to 90 points. Higher scores indicate more positive parent beliefs about the child and greater reliance on their caregiving role (Melnyk et al., 2014).

A sociodemographic and clinical questionnaire was applied jointly to NICU: PBS, containing items such as: parents age and schooling, family income, number and age of the children, prenatal consultations, NICU/ICU visits and their average time, religion, marital status situation, and health conditions during pregnancy. About the newborn: gestational age, weight, apgar, height, cephalic perimeter, hospitalization time, gender, delivery type and diagnosis, in order to characterize the sample that composed the study.

Procedure

The translation and cultural adaptation of the NICU: PBS and its validation to be used in Brazil was carried out considering the guidelines proposed by Beaton, Bombardier, Guillemin, & Ferraz (2000) and Guillemin, Bombardier, & Beaton (1993). To do so, the steps developed are shown in Figure 1.

In order to validate the contents of the NICU: PBS scale, nine expert judges (nurses, psychologists and/or doctors with master and/or doctoral degrees), were selected intentionally according to their knowledge in the neonatal area, from different locations in Brazil. They analyzed the

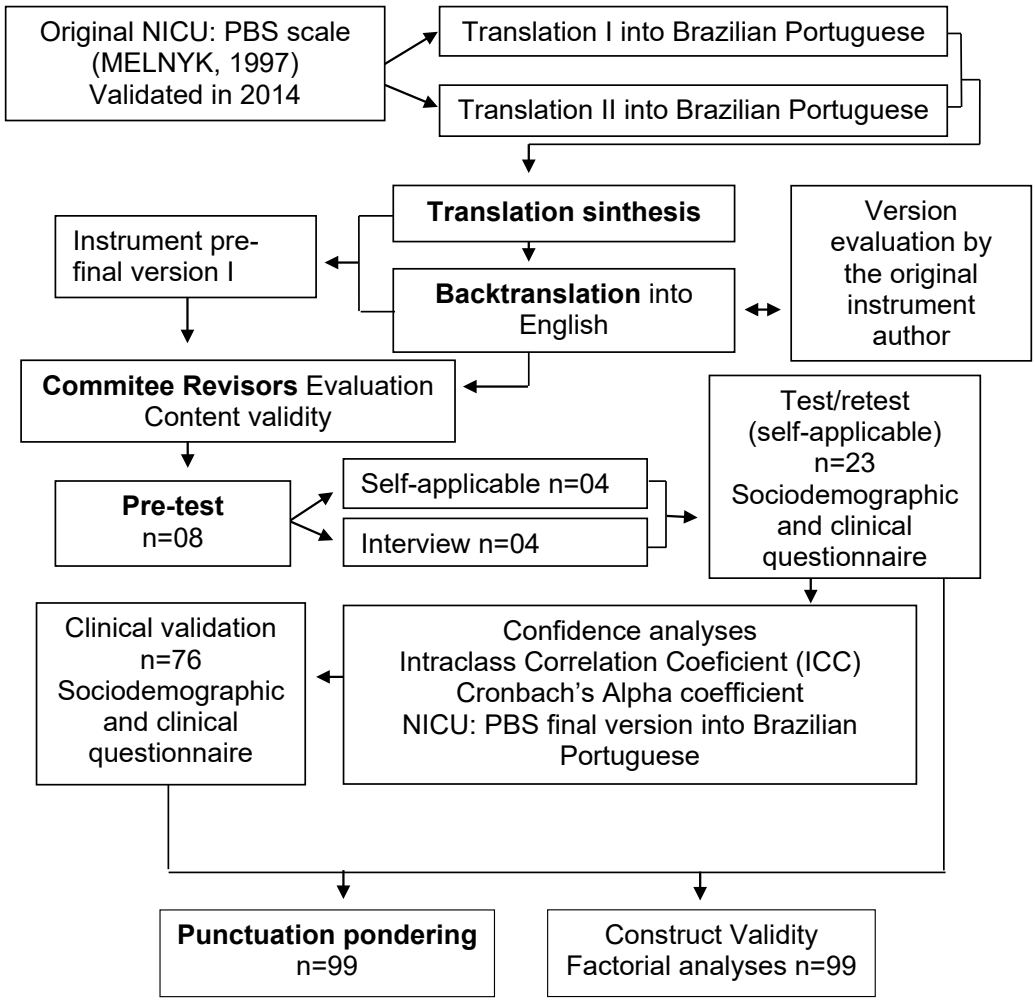

Figure 1. Translation diagram, cultural adaptation and clinical validation of the NICU: PBS scale.

content of the scale for semantic, idiomatic, conceptual and cultural equivalence, making comparisons between the original and the translated version, reaching a consensus on possible discrepancies.

In order to quantify the agreement degree between the expert judges, a concordance of 90 % or greater among committee members was accepted (Polit & Beck, 2006), as well as the Kappa coefficient use to evaluate agreement correcting unexpected events. In this sense, five categories were considered: values above .81 to 1.0 that represent perfect agreement; from .61 to .80 substantial agreement; from .41 to .60 moderate agreement; from .21 to .40 regular agreement; from zero to .20 weak to bad agreement (Landis & Koch, 1977).

Data Analysis

The data collected were submitted to descriptive statistical analyzes to characterize the sample of fathers and/or mothers who answered the test-retest and the scale validation sample, including also inferential analyzes, according to the study steps. In order to test the construct validity of the NICU: PBS scale adapted version, the Confirmatory Factor (CFA) and Exploratory Factor Analysis (EFA) were performed (Hair, Black, Babin, Anderson, & Tatham, 2009). The construct validity was verified, initially by the factors' CFA through the R® statistical program (Core Team R, 2015). Right after, EFA was conducted for a new structural model by using the main component analysis method with the Varimax orthogonal rotation and the Kaiser Meyer-Olkin method (KMO) for the data quality evaluation for factorial analysis.

In addition, the covariance matrix was calculated with maximum probability estimation, and the data consistency was evaluated through multivariate normality and the occurrence of discrepant values. The association with the original factors was verified with the correlation matrices

analysis, being evaluated by models that ranged from one to five. For the model fit test, the following indexes were analyzed: chi-square ($\chi 2$) and degrees of freedom (DF); RMSEA (Root Mean Square Error of Approximation); SRMR (Standardized Root Mean Square Residual) and CFI (Comparative Fit Index).

Satisfactory adjustment criteria of the model to the data were adopted, as it follows: the ratio $\chi 2$/DF; for RMSEA, values $\leq .10$, with values between .03 and .08 indicating better adjustments; for SRMR, good fit values $< .10$; and for the CFI, values $\geq .90$ (Hair et al., 2009). Statistical analyzes were performed on the XLStat® version 2015 and R® (Core Team R, 2015) programs. The significance level assumed in all statistical tests was .05.

Ethical aspects

Parents of preterm infants who participated in the study signed the Free and Informed Consent Form. It was submitted and approved by the Research Ethics Committee of UNIOESTE, under the approval number 385.370 and registration number 16348813.7.1001.0107, following all the ethical precepts.

RESULTS

The results are arranged according to the stages of cultural adaptation and clinical validation of the instrument. Firstly, we present the committee of judges' analysis, then the scale pre-test, the results obtained by the reliability and validity tests, and finally, the instrument score analysis.

In the committee of judges' analysis, a mean of agreement was reached for the translation consensus of 90 %, and this rate was considered adequate (Polit & Beck, 2006). Moreover, in Kappa evaluation, the value found was equal to .71, indicating substantial concordance among the judges (Landis & Koch, 1977), with a significant value ($p< .001$). The expert judges' suggestions concerning the translated scale were adequate, composing then the version for field tests.

As part of the cultural adaptation process, a pre-test of the pre-final version of the NICU: PBS scale was carried out in September 2015, with eight PTNB fathers and/or mothers, and the final version was considered culturally adapted, taking into account the parents understanding of 80 % or more. The pre-test showed that the items were written comprehensibly and were answered without any hesitation, with an understanding of 87.5 %. There was only one exception, the item 14 of the scale, which caused them doubt to understand meaning of "full-term". This item was adequate, inserting its explanation (born in the expected time) in parentheses, in the final version of the instrument. The self-applicable form was maintained as in the original instrument, since no difficulties were evidenced by the parents when responding. With this step achievement, the content validation of the Brazilian Portuguese-language version of the NICU: PBS scale was obtained.

The psychometric properties of reliability and validity were verified with the application of the NICU: PBS final version, between the fourth and eighth day of PTNB hospitalization. The scale reliability investigation was performed by the test-retest, which made it possible to evaluate its reproducibility; also by the analysis of the internal consistency and the dimensions found with the application of Cronbach's Alpha coefficient. The test-retest and a sociodemographic questionnaire were applied to a sample of 23 fathers and/or mothers, 16 of the NICU and seven of the Intermediate Care Unit (ICU).

The test-retest evaluation obtained an Intraclass Correlation Coefficient (ICC) value of .98 (95 % CI, .96 to .99). This result conferred excellent stability between the two evaluations (Cortés-Reyes, Rubio-Romero, & Gaitán-Duarte, 2010). It was found high internal consistency with Cronbach's Alpha of .92 (Hair et al., 2009), considering reliable and acceptable the instrument for its application among fathers and/or mothers with PTNB hospitalized in the NICU and ICU.

In order to verify the scale construct validity, CFA and EFA were performed with data collected from 99 fathers and/or mothers, after scale clinical validation, performed from December 2015 to May 2016. Considering the data quality evaluation, the general KMO described was .86, which demonstrated a good fit sample for the instrument validity analysis (Hair et al., 2009).

For testing the NICU: PBS factor structure, the CFA was performed to verify if the data obtained in this study could adjust to the original instrument model. The correlation matrix of the analyzed sample revealed the predominance of items, that is, 61 % with correlation equal to or greater than .3, being one of the criteria to perform the CFA. After the CFA was performed, five models were tested until the best fit to the original scale was obtained, as evidenced in the evaluation of the statistics of all tested model adjustment, chi-square, RMSEA, SRMR and CFI, in Table 1.

In the EFA performed for the 18 items by main components of the data collected and in the evaluation of the scree plot, the required analysis to demonstrate the *eigenvalues* associated to a component or factor in decreasing order versus the number of the component or factor, a factorial structure with three factors was specified: the trust in parental role, parental and child interaction, and parental

Table 1.
Measures of invariance of the original NICU: PBS (n = 388) and the models for NICU:PBS translated version (n = 99).

Models	Factors	Description	χ2 (DF)	p	RMSEA	SRMR	CFI
NICU: PBS original	3	Original scale results	49.33 (133)	< .0001	.08	.20	.87
A	3	Original Comparison	265.36 (132)	< .0001	.10	.08	.83
B	3	Just mothers	265.36 (162)	< .0001	.10	.08	.83
C	3	Theoretical Proposal	282.57 (132)	< .0001	.10	.08	.80
D	3	Exploratory Fact	23.59 (132)	< .0001	.08	.08	.87
E	3	Without items 2, 11 and 14	167.05 (87)	< .0001	.09	.08	.89

Note: Processed by the *R*® program *(Core Team R, 2015)*; p: chi-square test p-Value (χ2); *NICU: PBS: Neonatal Intensive Care Unit: Parental Belief Scale; RMSEA: Root Mean Square Error of Approximation*; *SRMR: Standardized Root Mean Square Residual*; *CFI*: *Comparative Fit Index*.

knowledge in the NICU, which together accounted for 63 % of the variance.

The model E, with 15 items and 56 % of variance explained, was the one that obtained better adjustments for this study, after exclusion of the correlations (items 2, 11 and 14) with lower factorial loads (Hair et al., 2009). The reliability values by Cronbach's Alpha for this model were α = .91 for the parental trust factor and α = .75 for the parental and child interaction factor.

EFA tests the theory that supports the factorial structure, which in this study found some items (1, 4, 5, 6, 9, 10, 16) similar to the structure of the original NICU: PBS model, supporting the theoretical representation of the three mentioned factors. Table 2 presents the factorial structure with the coefficient of determination associated to the standard error for each item of model E obtained with the EFA.

The three factors found for the EFA data in model E, similar to the original scale, obtained the most adequate adjustment indexes, although the items may be unstable in the respective factors and still improve the minimum criteria for a good adjustment. The results of the model before the adjustment analysis should be interpreted with caution, since three scale items were suppressed to obtain the best fit. It is indicated the sample increase for new studies and also the stability achievement among the factors, without necessity of alteration in the original NICU: PBS model.

Analysis of Instrument Scores

The re-examination of instrument score pondering in some situations is necessary since the scores of the original instrument do not always apply to the version adapted to the new cultural situation (Beaton et al., 2000). The original scale presents the indicative responses assessment with more positive beliefs for the larger scores and more negative beliefs for the lower scores, without the definition of a cut-off point, which leaves the analysis subjective. Thus, this stage of the analysis establishes a valuation for the Brazilian scale regarding the parental care capacity.

In this sense, a classification for the values obtained for the final score was proposed through a quartilization process, that is, a division into four parts: "Sufficiency of care capacity" between 90 and 72 points; " Moderate sufficiency of care capacity " for values from 71 to 54 points; "Moderate insufficiency of care capacity" for values from 53 to 36 points; and finally, "Insufficiency of care capacity" for values between 35 and 18 points.

From the categorization by using the total scores obtained with the instrument application, it was possible to observe individuals divided into three groups: a) group of subjects with "Sufficiency of care capacity" (scores between 90 and 72), 35 fathers and/or mothers; B) group of subjects with "Moderate sufficiency of care capacity " (scores between 71 and 54), with 50 fathers and/or mothers; and finally, c) group with "Moderate insufficiency of care capacity" (scores between 53 and 36), with 14 fathers and/or mothers. In order to categorize, a fourth classification was established, "Insufficiency of care capacity" (scores between 35 and 18), but considering these scores, individuals who scored in this category of the study, were not obtained.

The statistical significance of the scale items was checked taking into account the defined categories, and the comparison among groups was obtained by using the Kruskal-Wallis (KW) statistical test. Table 3 presents the description of the data representation for each variable among the "Sufficiency", "Moderate Sufficiency" and "Moderate Insufficiency" to care capacity groups.

Table 2.
Factor structure model E of NICU: PBS.

Items	Trust in parental role		Parental and child interaction		Parental knowledge in the NICU	
	Coefficient	Error Pattern	Coefficient	Error Pattern	Coefficient	Error Pattern
1	-	-	-	-	.89	.10
3	-	-	-	-	.46	.12
4	-	-	-	-	.97	.10
5	.64	.09	-	-	-	-
6	.85	.09	-	-	-	-
7	-	-	.55	.11	-	-
8	-	-	.87	.10	-	-
9	.75	.08	-	-	-	-
10	.85	.09	-	-	-	-
12	.78	.09	-	-	-	-
13	.78	.08	-	-	-	-
15	.63	.08	-	-	-	-
16	-	-	.61	.09	-	-
17	.66	.10	-	-	-	-
18	.72	.09	-	-	-	-

Table 3.
Sufficiency, Moderate Sufficiency and Moderate Insufficiency of care capacity groups, at NICU: PBS.

	Sufficiency of Care Capacity			Moderate Sufficiency of Care Capacity			Moderate Insufficiency of Care Capacity			p
Estatistics	Median	Q1	Q3	Median	Q1	Q3	Median	Q1	Q3	
1	4 A	4	4	3 B	2	4	2 C	1	2	< .0001
2	4 A	4	5	4 B	4	4	2 C	3,5	4	< .0001
3	4 A	4	5	4 B	2	4	2.5 B	2	4	< .0001
4	4 A	4	5	3 B	2	4	2 C	1.25	2	< .0001
5	4 A	4	4.5	4 B	3	4	2 C	2	2.75	< .0001
6	4 A	4	5	3 B	2	4	2 C	2	2.75	< .0001
7	4 A	4	5	4 B	3	4	2 C	2	2.75	< .0001
8	5 A	4.5	5	4 B	4	5	4 C	2	4	< .0001
9	4 A	4	5	4 B	4	4	2 C	2	2	< .0001
10	4 A	4	5	3 B	2.25	4	2 C	2	2	< .0001
11	5 A	4	5	4 B	4	4	4 B	4	4	< .0001
12	4 A	4	5	3 B	3	4	2 C	2	2	< .0001
13	4 A	4	5	4 B	3.25	4	2 C	2	3	< .0001
14	4 A	4	5	4 B	3	4	4 B	3.25	4	≤ .0200
15	4 A	4	5	4 B	3	4	3.5 C	2	4	< .0001
16	5 A	4	5	4 B	4	5	4 B	2.5	4.75	< .0001
17	4 A	4	4	3 B	2	4	2 C	2	2	< .0001
18	4 A	4	5	4 B	3	4	2 C	2	2	< .0001

Note. Processed by: *R® program (Core Team R, 2015)*; p: *p*-Value of *Kruskal-Wallis* test *(KW)*; Q1: First Quartile; Q3: Third quartile; *Letters $^{A, B}$ and ^{C} establish different statistical relation.

When comparing the groups "Sufficiency of care capacity" and "Moderate sufficiency of care capacity", it was possible to verify that all items of the scale were considered statistically different, as well as, when comparing the groups "Sufficiency of care capacity" and "Moderate insufficiency of care capacity". By using Dunn test to compare the groups "Moderate sufficiency of care capacity " and "Moderate insufficiency of care capacity", only items 3, 11, 14, 16 did not present significant statistical differences ($p > .05$).

DISCUSSION

The NICU: PBS, in the Brazilian Portuguese version, presents adequate indicators of content validity and cultural adaptation, reliability and evidence of construct adequacy in three factors for the application to the Brazilian population. In relation to the existence of scales that address the parents' beliefs of preterm infants in NICU, as well as, studies that evidence the use or validation of the NICU: PBS scale in other countries, no relevant publications were found, except for the original scale validation study, which prevented comparisons among studies and different populations.

As the NICU: PBS scale allows the measurement of parental beliefs about the parental role and the behavior of the hospitalized premature baby, it permits the anticipation of the stress influences that affect the parents in this environment. Since the PTNB hospitalization is a difficult situation and alters the daily family life, it can lead to feelings such as, anxiety, fear and psychological distress (Pereira, Abrão, Ohara, & Ribeiro, 2015).

The Brazilian version of NICU: PBS obtained high reliability in its application, since the Cronbach's alpha coefficient was .92, approaching the values found for the total score of the original NICU: PBS scale that was between .90 and .93 (Melnyk et al., 2014). The test-retest allowed the reproducibility verification of the NICU: PBS and presented excellent stability between the two ICC evaluations of .98 (95% CI .96 to .99) (Cortés-Reyes et al., 2010). This satisfactory CCI value highlights the stability of the score over time. Melnyk et al. (2014) compared to NICU: PBS, also obtained excellent stability, with correlation values between .84 and .92 for the test-retest. The values were lower than in the application of the Brazilian version of NICU: PBS, but differences are expected due to the socioeconomic and cultural contexts of the populations.

Regarding the validity of NICU: PBS, from the CFA realized, it did not fit the original model, which also did not obtain good adjustments for this type of analysis. EFA found a factorial structure with three factors: trust in parental role, parental and child interaction, and parental knowledge in the NICU, which together accounted for 56 % of variance.

The model E obtained reliability with Cronbach's alpha of .91 and .75, respectively, for the factors of trust in parental role and parental and child interaction; and more adequate adjustments indexes, presenting construct validity evidences. Although an adjustment index does not show acceptance, it is close to the expected values, and an isolated index should not be a criterion for the model qualification as an adjusted one or not, but the combination of these (Hair et al., 2009). The adjustment indexes of model E were similar to the ones found by Melnyk et al. (2014) in the original study for the three-factor structure of the instrument. It is possible to highlight the results for the model may be unstable and, although being adequate, they do not meet the minimum criteria for good adjustments.

Thus, the EFA applied suggests that the participant fathers and mothers noticed the parental beliefs facing the three constructs guided by the original NICU: PBS, but in a differently arranged structure of the items. The differences found may be due to the small number of items presented by two of the factors, and by the factorial loads of the instrument below .80, which, when compared to a smaller sample, increase the possibility of unstable factor solutions (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005).

Regarding the pondering of the instrument scores, the original NICU: PBS scale indicates the response assessment pointing out more positive beliefs for the higher scores and more negative beliefs for the lower ones (Melnyk et al., 2014). As this classification indicates subjectivity, in the present study, values were added to the answers. Thus, there was a significant statistical difference among the parents' groups and only a few items of the instrument did not present significant differences. These groups are between the two borderline groups of the classification for the care capacity, "Moderate sufficiency of care capacity" and "Moderate insufficiency of care capacity".

These items correspond to number 3 ("I feel comfortable taking care of my baby in the NICU") and 11 ("I am sure about how my emotions can affect my baby while he/she is in the hospital"), which are considered subjective aspects of the parents' feelings, being similar to both groups' responses. It may be a result of the influence by health team's hostage strategy working on the parents' emotional needs, since it is important for the mother-child care's success (Gonya & Nelin, 2013). Parents experience a myriad of negative feelings and emotions about the hospitalization of the PTNB, such as: guilt, anxiety, insecurity, impotence, distress (Melnyk et al., 2014; Melnyk, Crean, Feinstein, & Alpert-Gillis, 2007; & Rodrigues, 2010). However, it is essential for the individual to be prepared to manage these

feelings with autonomy, be able to ponder the information, as well as the competences that are stimulated by understanding (Freire, 2009).

Considering item 14 ("I know how my baby's appearance and behavior are different from the appearance and behavior of a full-term baby"), since most parents in both groups agreed with the statement. It may be related to the fact that the parents of the group "Moderate insufficiency of caring capacity" hold this knowledge due to the influence of their baby's perception of fragility, taking into account some feelings, for instance, the parental anxiety, which can increase perception of babies vulnerability (Boykova & Kenner, 2012; Schappin, Wijnroks, Venema, & Jongmans, 2013). For item 16 ("I feel confident asking doctors and nurses about the clinical condition of my baby"), the absence of statistical differences between the two parental groups may be associated with the parents' lack of knowledge from the "Moderate insufficiency of care capacity" group, due to their real babies' health condition.

Unrealistic beliefs and expectations about the child, motherhood and parenthood interfere with parents' ability to understand and predict the behavior of infants, making it difficult for them to cope with their children and their needs (Melnyk et al., 2001). Therefore, providing parents of PTNB in the NICU accurate and adequate information about the behavior, characteristics and development of preterm infants result in positive beliefs and feelings of trust to parents, with a positive impact on the development of the child (Melnyk et al. 2014).

The NICU: PBS scale is an important tool to base and enrich the health team's performance facing the beliefs of the PTNB parents, allowing them to intervene in their care capacity, identifying caregivers at risk of stress in the NICU and permitting adequate attention to the PTNB hospitalized at NICU or ICU and also for the hospital discharge.

The Brazilian NICU: PBS version is an instrument that obtained good internal consistency of the items, test-retest reliability and evidence of validity for an adjustment in three factors. The validity evaluation of any instrument should be established in a continuous and permanent process, in order to highlight any need for adaptation or reformulation in the various contexts (Kuwabara, Évora, & Oliveira, 2010). Cultural, social and developmental reflexes of sample countries and regions can also influence that. It is recommended to carry out new studies without the items exclusion from the NICU: PBS scale, to enable future comparisons and also by using extended samples.

The study provides evidence that NICU: PBS scale is psychometrically reliable and suitable to be used with PTNB parents at NICU, considering the high internal consistency of their items, when applied to the Brazilian population. The EFA indicated that the number of factors faced to the constructs formation met the theoretical expectations regarding the original scale validation study, although the items related to the factors were unstable.

Thus, it is evident that the found factorial structure offers adequate results, but it requires the measurement improvement, indicated by the CFA. Complementary investigations will be necessary to confirm a good adjustment of the scale for the Brazilian sample. Therefore, it is advisable that NICU: PBS scale continues to be tested for its psychometric properties in different sociocultural and populational situations in Brazil. Its application in several contexts will promote a generalization of results and certify the instrument use viability in health practices.

REFERENCES

Araújo, B. B. M., & Rodrigues, B. M. R. D. (2010). Mothers' experiences and perspectives regarding their premature infant's stay at the neonatal intensive care unit. Revista da escola de enfermagem da USP, 44(4), 865-872. doi: 10.1590/S0080-62342010000400002

Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, 25(24), 3186-3191.

Boykova, M., & Kenner, C. (2012). Transition from hospital to home for parents of preterm infants. *The Journal of perinatal & neonatal nursing*, 26(1), 81-87. doi:10.1097/JPN.0b013e318243e948

Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância de doenças e agravos não transmissíveis e promoção da saúde (2015). *Saúde Brasil 2014: uma análise da situação de saúde e das causas externas*. Brasília: MS. Retirado de: http://pesquisa.bvsalud.org/portal/resource/pt/sus-30759

Brett, J., Staniszewska, S., Newburn, M., Jones, N., & Taylor, L. (2011). A systematic mapping review of effective interventions for communicating with, supporting and providing information to parents of preterm infants. *BMJ Open*, 1(1), 1-11. doi: 10.1136/bmjopen-2010-000023

Cortés-Reyes, E., Rubio-Romero, J. A., & Gaitán-Duarte, H. (2010). Métodos estadísticos de evaluación de la concordancia y la reproducibilidad de pruebas diagnósticas. *Revista Colombiana de Obstetricia Ginecología*, 61(3), 247-255.

Einspieler, C., Bos, A. F., Libertus, M. E., & Marschik, P. B. (2016). The general movement assessment helps us to identify preterm infants at risk for cognitive dysfunction. *Frontiers in Psychology*, 7(406), 1-8. doi: 10.3389/fpsyg.2016.00406

Forcada-Gaux, M., Borghini, A., Pierrehumbert, B., Ansermet, F., & Muller-Nix, C. (2011). Prematurity, maternal posttraumatic stress and consequences on the mother-infant

relationship. *Early human development*, 87(1), 21-26. doi: 10.1016/j.earlhumdev.2010.09.006

Freire, L. G. L. (2009). Auto-Regulação da aprendizagem. *Ciência & Cognição*, 14(2), 276-286.

Gonya, J., & Nelin, L. D. (2013). Factors associated with maternal visitation and participation in skin-to-skin care in an all referral level IIIc NICU. *Acta Paediatrica*, 102(2), 53-56. doi: 10.1111/apa.12064

Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of heatlh-related quality of life measures: literature review and proposed guidelines. *Journal of clinical epidemiology*, 46(12), 1417-1432. doi: 10.1016/0895-4356(93)90142-N

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. Porto Alegre: Bookman.

Hogarty, K. Y., Hines, C. V., Kromrey, J. D., Ferron, J. M., & Mumford, K. R. (2005). The quality of factor solutions in exploratory factor analysis: the influence of sample size, communality, and overdetermination. *Educational and Pysichological Measurement*, 65(2), 202-226.

Korja, R., Latva, R., & Lehtonen, L. (2012). The effects of preterm birth on mother-infants interaction and attachment during the infant's first two years. *Acta obstetricia et gynecologica Scandinavica*, 91(1), 164-173. doi: 10.1111/j.1600-0412.2011.01304.x

Kuwabara, C. C. T., Évora, Y. D. M., & Oliveira, M. M. B. (2010). Risk management in technovigilance: construction and validation of a medical-hospital product evaluation instrument. Revista latino-americana de enfermagem, 18(5), 943-951. doi: 10.1590/S0104-11692010000500015

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159-174. doi: 10.2307/2529310

Martins, L., & Oliveira, E. A. (2010). Percepções da mãe diante dos cuidados de saúde oferecidos ao binômio mãe/recém-nascido na internação neonatal. *Comun. ciênc. saúde*, 21(2), 107-116.

Melnyk, B. M., Alpert-Gillis, L., Feinstein, N. F., Fairbanks, E., Schultz-Czarniak, J., Hust, D., … Sinkin, R. A. (2001). Improving cognitive development of low-birth-weight premature infants with the COPE program: a pilot study of the benefit of early NICU intervention with mothers. Research in Nursing & Health, 24(5), 373-389. doi: 10.1002/nur.1038

Melnyk, B. M., Crean H. F., Feinstein, N. F., Fairbanks, E., & Alpert-Gillis, L. J. (2007). Testing the theoretical framework of the COPE program for mothers of critically Ill children: an integrative model of young children's post-hospital adjustment behaviors. Journal of Pediatric Psychology, 32(4), 463-474. doi: 10.1093/jpepsy/js1033

Melnyk, B. M., Oswalt, K. L., & Sidora-Arcoleo, K. (2014). Validation and Psychometric Properties of the Neonatal Intensive Care Unit Parental Belief Scale. *Nursing Research*, 63(2), 105-115. doi: 10.1097/NNR.0000000000000023

Montirosso, R., Provenzi, L., Calciolari, G., & Borgatti, R. (2012). Measuring maternal stress and perceived support in 25 italian NICUs. *Acta Paediatrica*, 101(2), 136-142. doi: 10.1111/j.1651-2227.2011.02440.x

Pereira, L. B., Abrão, A. C. F. V., Ohara, C. V. S., & Ribeiro, C. A. (2015). Maternal experiences with specificities of prematurity that hinder breastfeeding. *Texto & Contexto-Enfermagem*, 24(1), 55-63.

Polit, D. F., & Beck, C. T. (2006). The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29(5), 489-497. doi: 10.1002/nur.20147

Schappin, R., Wijnroks, L., Venema, M. M. A. T. U., & Jongmans, M. J. (2013). Rethinking stress in parents of preterm infants: a meta-analysis. *Plos One*, 8(2), 1-19. doi: 10.1371/journal.pone.0054992

United Nations (2015). *The millennium development goals report 2015*. New York: United Nations. Retrieved from: https://nacoesunidas.org/wp-content/uploads/2015/07/MDG-2015-June-25.pdf

World Health Organization (2012). *Born too soon: the global action report on preterm birth*. New York: World Health Organization. Retrieved from: http://apps.who.int/iris/bitstream/10665/44864/1/9789241503433_eng.pdf