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Research Article

Cultural Adaptation and Validation of the Parental Health Literacy Activities Test-8 with Portuguese Parents

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Background. Parents' health literacy has a great impact on child's care and health. Knowing parent's health literacy levels is crucial to avoid the consequences of limited literacy and for the creation of better health policies and educational interventions. To assess those levels, we must have tools tailored to this population. However, there is a lack of specific instruments to evaluate this capacity in Portuguese parents of children aged less than 12 months. *Aim.* To perform the cultural adaptation and psychometric validation of the Parental Health Literacy Assessment Test-8 for use in Portugal. *Methods.* Methodological study is divided into two phases: cultural adaptation and psychometric validation. The first phase followed the Beaton guidelines. The second, carried out with 176 parents, took place at a public hospital in Portugal, between October 2020 and June 2021. Data were analyzed for internal reliability using the Kuder–Richardson reliability coefficient (KR-20). Confirmatory factor analysis was used to estimate factor validity, applying polychoric correlation measures using the "lavaan package" for the *R* statistical package. *Results.* In the cultural adaptation, the expert committee adjusted the translated version, validating the content for Portuguese parents. At validation, the calculated value of KR-20 was approximately 0.50. The empirical indices of the goodness-of-fit of the factor model showed a good overall fit, although two of the items had low weights (0.24 and 0.32). The results of the factors show an acceptable value for the factor (FC = 0.756) and a lower value for the average variance extracted. *Conclusion.* The version of the instrument adapted for Portugal presented adequate semantic and content equivalence. The psychometrics suggested that the PHLAT-8-PT is a reliable and valid instrument that can be used systematically by the health team to measure the health literacy levels and improve health education.

1. Introduction

Parental Health Literacy (HL) [1] as an impact on the health outcomes of their children on daily basis, parents face with situations that require HL, commonly defined as the ability to obtain, understand, and use health information to make health informed decisions [2]. However, parental HL levels are inadequate [3–5]. That means, parents with low or inadequate HL require a greater effort to follow medical guidelines [6], to dose prescribed drugs correctly [7] and understand nutrition and non-prescription drug labels [8], which can cause higher hospitalization rates and visits to emergency services [9]. Inadequate HL is also related to maternal depression [10], with a lower rate of exclusive breastfeeding after maternity discharge [11] and with the prevalence of obesogenic behavior [12]. Therefore, promoting parental HL is essential to prevent and better manage health problems for children but also for parents.

It is imperative that nurses contribute to reverse this serious situation by including HL as an essential component of all nursing care that will enhance the provision of person-centered care and patient safety [13]. Measuring parent's HL is crucial to avoid the consequences of limited literacy and

achieve this goal. Parents with adequate HL levels are more able to take responsibility and be involved in making decisions related to their childcare.

There are several instruments designed to evaluate HL among the adult population [14], that were culturally adapted and validated in Portugal, namely, the Test of Functional Health Literacy in Adults (TOFHLA) [15], designed to evaluate the level of comprehension of patients before the existing communication in the medical area, and the Rapid Estimate of Adult Literature in Medicine (REALM) [16], developed to be used in ambients of public health and of primary care with the purpose of identifying patients with a lower level of reading. However, those instruments, used for the adult population, are not considered suitable to assess HL on comprehensive parenting skills for parents of children aged less than 12 months [17]. Instruments that can evaluate the HL considering the Portuguese reality are yet limited. It is useful to have an instrument specific for this population because HL is specific on the content and context [18].

The literature review identified the Parental Health Literacy Activities Test-8 (PHLAT-8) [17] as the only instrument designed specifically for this population. The PHLAT-8 is a reduced version of the PHLAT-10, that was originally created in the United States of America, using psychometric analysis to assess the level of HL of parents of children aged less than 12 months as a good internal reliability (KR-20 = 0.64). It was also translated and validated to the Spanish population [19]. The instrument investigates the abilities of literacy in health and numerical comprehension of caregivers of children aged less than 12 months and as eight open-ended questions, covering the fields of nutrition, therapeutic dosing, and food allergies that can be carried out in writing or orally [18].

Making PHLAT-8 validated to Portugal will allow having an HL instrument specific for parents. It may improve clinical practice by measuring the HL levels and increasing the accuracy of the educational interventions intended to promote HL. Therefore, this study aimed to perform the cultural adaptation and psychometric validation of the instrument PHLAT-8 for use in Portugal.

2. Materials and Methods

2.1. Design. This was a methodological study conducted in two phases: cultural adaptation and psychometric validation. In the first phase, the translation and adaptation of the instrument were completed according to the guidelines given by Beaton et al. [20]. This cultural adaptation to Portuguese is necessary because the original instrument is in English and the two cultures use different meanings, making the items challenging to understand. The second phase evaluated the instrument's final psychometric properties.

2.2. Samples and Procedures. The study population consisted of healthy Portuguese parents (mothers/fathers), able to read and write, and whose children were less than 12 months old, admitted in a neonatal setting. They excluded those with visual impairments (corrected vision <20/50 assessed by the Rosenbaun Pocket Vision Screener) and/or severe cognitive impairment. The study took place in a neonatal department of a Portuguese referral governmental hospital.

The pretesting version of the instrument was submitted to a convenience sample [21] of 30 participants, who meet the inclusion criteria. For the calculation of the pretesting sample, literature recommendations were observed [20], that means testing ideally between 30 and 40 persons.

After the pretesting, the instrument was validated by a convenience sampling of 176 parents (mothers/fathers), who meet the same inclusion criteria. The recommendation for factor analysis was used in validation, that is, a minimum of five observations per item of the scale [22]. The ratio used in this study was more than 20-to-1, which guaranteed the principle of variability to estimate the parameters [23].

Data were collected using a sociographic questionnaire (age, sex, level of education, and monthly income) and the PHLAT-8. Participants were provided with the form and the images/labels corresponding to each question so that they could consult and write down their answers.

2.3. Cultural Adaptation. It includes the adaptation for European Portuguese language and culture, following the stages recommended by Beaton et al. [20]: translation by two translators, synthesis of the two translations, back-translation, and expert committee, followed by a pretesting.

The translation and cultural adaptation were performed by two independent, bilingual, bicultural translators, whose native language was Portuguese, with different knowledge backgrounds to avoid language biases (T1 and T2). Both were asked to emphasize semantic equivalence and the use of language that can be understood by the general population. The two resulting translations (T1 and T2) were then compared with each other and with the original version of the instrument by the two translators to detect, discuss, and correct any discrepancies. This consensus meeting resulted in a synthesis of the translations (T-12). The main researcher mediated this process and wrote a report on the discrepancies found and how they were resolved. The next stage resulted in two back-translations (BT1 and BT2), performed by two new independent translators, whose native language was English, with qualifications and characteristics such as the previous ones, to evaluate mismatched meanings between the original instrument and the translation. There was no divergence between the translators during this process.

Subsequently, this version was evaluated by an expert committee. The committee included: an expert in health assessment instruments, a pediatric health professional, a linguistics professional, and all the elements involved in the previous stages, as recommended by Beaton et al. [20]. Experts were selected in the researchers' network through the inclusion criteria: mastery of both languages and experienced in the thematic area of the instrument. The committee analyzed the correctness, consistency, and adequacy of the content, scoring each item from 1 to 5, the closer to 5, the more adaptable the item is for the intended evaluation. It was offered the possibility of adding free

comments to each item. The goal of this assessment was to design the prefinal version of PHLAT-8-PT. Open questions were resolved through discussion within the experts, which compared the content of the harmonized version with the English version. We established that the item with less than 80% agreement was changed in their wording until all members reached an agreement. The committee reached an agreement on the semantic, idiomatic, and conceptual equivalence between the English version and a final version of the instrument provided, greater than 80%. Modifications were made to maintain a simple and clear language for the Portuguese context without changing the genuine meaning of the individual questions.

Ultimately, the pretesting version of the instrument was conducted, to evaluate parents' perception in terms of their understanding and the clarity of the text of the instrument and to evaluate the validity of the instrument's content in this sample. Face validity through cognitive debriefing was performed during pretesting using guide questions. Developers of the original instrument were involved in all stages.

After the pretesting, the instrument was validated. To measure the internal reliability of the PHLAT-8, the Kuder–Richardson reliability coefficient (KR-20) was used, a variation of Cronbach's alpha for dichotomous variables, because all variables are qualitative. The cutoff point for factor loadings was $\beta = 0.40$. Confirmatory factor analysis (CFA) was used to estimate factor validity, applying polychoric correlation measures matrix performed (dichotomous data) using the "lavaan package" for the R Statistical Software because we already have preview information about the factorial structure of the model that we are going to confirm. The empirical indices of the PHLAT-8 model's goodness-of-fit to the variance and covariance data of the items were considered: Chi-Square Over Degrees of Freedom (χ^2/df ≤ 4.0); Comparative Fit Index (CFI ≥ 0.90); Normed Fit Index (NFI ≥ 0.90); Tucker–Lewis Index (TLI ≥ 0.90); and RMSEA (≤0.10).

2.4. Ethical Procedures.

This study was approved by the Research Ethics Committee of the hospital on July 3, 2019, Resolution E.E909519. In the application of the instrument, verbal and written consent was requested from participants. Anonymity and confidentiality of responses were ensured, and informed consent form was provided. The authorization given by the author of the original instrument was obtained by email.

3. Results

3.1. Cultural Adaptation.

After applying the instrument with parents in the pretesting phase, some issues have been raised. The first question of the instrument asked parents about the amount of water and number of spoons of the prescribed formula according to the instructions on the package. In the second question, because there is no concentrated formula in Portugal, the original name of the concentrate was retained. Thus, question number 1 was "Using the

instructions provided for the powder formula *Enfamil*, how much water and how many spoons of milk formula powder must you add to prepare a 118 ml bottle?" and question number 2 was "Using the instructions provided for *Enfamil* concentrated formula, how much water and how much concentrate do you need to add to prepare a 118 ml bottle?"

The final version of the translation of the PHLAT-8 into European Portuguese, the PHLAT-8-PT, kept the same number and order of questions as the original version, maintaining semantic and content equivalence.

3.2. Validation.

Of the 176 participants in the study, 13.6% were male and 86.4% were female, between the ages of 21 and 45 (Min = 21; Max = 45) years, with a mean age of 32 years ($M = 32.45$) and a standard deviation of 5 years (SD = 4.87). Regarding the level of education, 98 had a complete secondary education, 51 had a university degree, 9 had a basic education up to secondary school, 6 had a basic education up to middle school, 5 had a master's degree, 4 had an incomplete secondary education, 2 had a basic education up to elementary school, and 1 had an incomplete basic education. In terms of family income, 5.1% of the parents were on the poverty line, 11.9% earned a minimum wage, and 83% had an income between 665€ and 1500€.

The internal consistency of the PHLAT-8-PT and the reliability of each of its indicators were evaluated using the Kuder–Richardson reliability coefficient (KR-20) (a test that replaces Cronbach's alpha for dichotomous data). The calculated value of KR-20 for the PHLAT-8-PT was about 0.50 (KR-20 = 0.493), indicating acceptable consistency [24]. The standardized estimates of the items show the factor weights, mostly higher than the reference value ($\beta = 0.40$), while items p2 and p4 presented factor loadings as shown in Table 1.

The PHLAT-8-PT factor model is presented in Figure 1, including factor loadings and goodness-of-fit indices that support the model. The empirical indices of the goodness-of-fit of the factor model showed a good overall fit, although two of the items had low weights (0.24 and 0.32). Chi-Square Over Degrees of freedom χ^2/df = 1.801; Comparative Fit Index, CFI = 0.919; Normed Fit Index, NFI = 0.840; Tucker–Lewis Index, TLI = 0.886; and Root Means Square Error of Approximation, RMSEA = 0.068.

Composite reliability (CR) estimates the internal consistency of reflective items of a factor or construct. The results for the PHLAT-8-PT factors showed an acceptable value for the factor (FC = 0.756) and a lower value of the average variance extracted (AVE = 0.357) [25].

4. Discussion

The present study allowed performing the cultural adaptation and psychometric validation of the instrument Parental Health Literacy Assessment Test-8, for use in Portugal. To our knowledge, this is the first HL assessment instrument specific to parents of children aged less than 12 months and the first instrument of its kind available in Portuguese. The process of translation and cultural adaptation was

TABLE 1: Factor loadings obtained from CFA applying a polychoric correlation matrix and internal consistency analysis (KR-20) of each PHLAT-8-PT factor (8 items) ($n = 176$).

PHLAT-8-PT	Factor loadings (β)
Item 1 (p1)	0.41
Item 2 (p2)	**0.24**
Item 3 (p3)	0.74
Item 4 (p4)	**0.32**
Item 5 (p5)	0.80
Item 6 (p6)	0.78
Item 7 (p7)	0.52
Item 8 (p8)	0.47

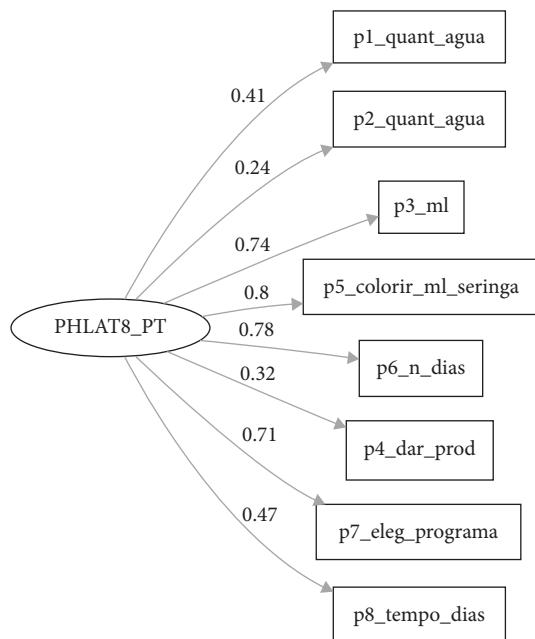Bold was determined to select items with factor loading higher than 0.40 (reference value = 0.40).

FIGURE 1: Confirmatory factor analysis of the PHLAT-8-PT factorial model.

satisfactory. The adaptation of the instrument for European Portuguese maintained the 8 items that comprise the original instrument.

The reliability was acceptable; however, the average extracted variant was low, indicating weak convergent validity when compared to the results of the Spanish version developed by Yin et al. [19], in which KR-20 = 0.61. Regarding statistical validation, although two items (p2 e p4) presented with low weights (less than 0.4), the global adjustment of the model was acceptable and present fit indices indicated reasonable fit. To the best of our knowledge, there are no studies with other instruments that assess HL of this specific population, so it is not possible to do a comparative analysis.

There is a need for further studies with a more wide-reaching and heterogeneous sample of parents of children aged less than 12 months to provide consistent validation of PHLAT-8-PT. It may also be relevant to analyze the content of the items and adjust it by reviewing their formulation and making them clearer and more related to the objective of the instrument. These future analyses are important since the HL remains a challenge in clinical practice that needs to be addressed [26]. Currently, identifying people with low HL is one of the best practices to help the health team in dealing with limited health literacy [27]. It is crucial that we continue to invest in the development of instruments capable of assessing HL of this specific population [28]. Having a valid instrument available for the health team will allow the identification of the HL needs of parents and contribute towards the implementation and evaluation of educational interventions for promoting their HL.

The study has some limitations that must be addressed. It is a single-centre study, given the constraints imposed by the COVID-19 pandemic, and the number of participants in some of the age categories was low, limiting the scope of the collected data and the generalizability of the findings. We also used a convenience sample of parents, which was not representative of Portuguese parents. Another limitation is the variable qualitative characteristics of the instrument.

The result of the present study is believed to be able to contribute new knowledge because it allows an accurate knowledge of HL in this population and the comparison of data between different cultural contexts. However, the result should be interpreted considering the limitations.

According to those results, the Portuguese version of the PHLAT was found to be a valid and reliable instrument to evaluate the HL of parents in a neonatal setting. We recommend including this instrument in the neonatal setting practice to evaluate its performance and contributions to improve parents' HL.

5. Conclusion

The Portuguese version of the PHLAT-8 presented an adequate semantic and content equivalence. It also presented reasonable internal consistency when compared to the Spanish version. These values may be explained by the homogeneity of the sample, considering that the data were collected in only one hospital unit. The results allow concluding that this is a reliable and valid instrument that can be used systematically by the health team, within the neonatal setting, to assess parents' HL, which contributes to improved care and help professionals improve health education.

Data Availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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