



Jornal de Pediatria

www.jpmed.com.br



ORIGINAL ARTICLE

Pediatrics ACES and related life event screener (PEARLS): translation, transcultural adaptation, and validation to Brazilian Portuguese

Q1 Luciana Cristina Mancio Balico ^{id a,*}, Neeta Thakur ^{id b}, Dayna Long ^{id c}, Emerson Rodrigues da Silva ^{id d}, Vandrea Carla de Souza ^{id a}

^a Universidade de Caxias do Sul, Programa de Pós-Graduação em Ciências da Saúde, Caxias do Sul, RS, Brazil

^b University of California San Francisco, Department of Medicine, Division of Pulmonary and Critical Care Medicine, San Francisco, CA, USA

^c University of California San Francisco, Benioff Children's Hospital Oakland, Oakland, CA, USA

^d Universidade de Caxias do Sul, Curso de Medicina, Caxias do Sul, RS, Brazil

Received 10 April 2024; accepted 10 October 2024

Available online xxx

KEYWORDS

Adverse childhood experiences;
Translation;
Validation studies;
Screening

Abstract

Objective: Adverse Childhood Experiences (ACEs) have been associated with negative health outcomes. Screening for ACEs is crucial for improving health results, however, there is a shortage of standardized tools designed for children in Brazilian Portuguese. This study aimed to translate, culturally adapt, and validate the Pediatrics ACES and Related Life Event Screener (PEARLS) for use in Brazil.

Method: The study followed a methodological design for cross-cultural adaptation and psychometric evaluation. The PEARLS was translated and culturally adapted following a methodology that includes translation, synthesis, expert committee evaluation, target audience evaluation, and back-translation. After adaptation, a pilot cross-sectional study was conducted at a Multidisciplinary Health Care Clinical Center and a General Hospital-Reference Center for Child and Adolescent Care to assess the instrument's internal consistency, convergent validity, content validity and test-retest reliability.

Results: The PEARLS-Br versions for Children, Teens, and Teen Self-Report were developed and subjected to pilot testing with 202 subjects. Participants demonstrated excellent comprehension, with Verbal Rating Scale median scores of 4 (IQR 4–5). Internal consistency was high, with Cronbach's alpha coefficients ranging from 0.78 to 0.81. Content validity, assessed by Kappa, indicated slight to almost perfect agreement across constructs. Test-retest reliability, assessed by Spearman's correlation coefficient, ranged from 0.89 to 0.94.

Conclusions: PEARLS-BR (Child, teen, and teen self-report versions) were successfully translated, culturally adapted, and validated for assessing ACEs in Brazilian children and adolescents.

* Corresponding author.

E-mails: lcmbalico@ucs.br, psicologa@lucianamancioabalico.com (L.C. Balico).

<https://doi.org/10.1016/j.jpmed.2024.10.003>

0021-7557/© 2024 Sociedade Brasileira de Pediatria. Published by Elsevier Editora Ltda. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Please cite this article in press as: L.C. Balico, N. Thakur, D. Long et al., Pediatrics ACES and related life event screener (PEARLS): translation, transcultural adaptation, and validation to Brazilian Portuguese, *Jornal de Pediatria* (2024), <https://doi.org/10.1016/j.jpmed.2024.10.003>

This tool fills a crucial gap in ACE assessment in the Brazilian context, aligning with global recommendations for screening ACEs to improve overall health outcomes.

© 2024 Sociedade Brasileira de Pediatria. Published by Elsevier Editora Ltda. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1 Introduction

Adverse Childhood Experiences (ACEs) are defined as stressful or traumatic events that children experience before the age 18 years.¹ These adversities are associated with the development of long-term health conditions.²⁻⁴ The landmark ACE Study conducted in adults revealed a clear dose-response relationship between ACE scores and their impact on health, indicating that ACE scores are associated with an increased likelihood of developing severe psychological issues such as substance dependency, depression, and suicide, as well as physical conditions including hepatitis, cardiac ischemia, lung cancer, and chronic obstructive pulmonary disease in adulthood.²

The ACE Study led to the development of the “Pediatrics ACEs and Related Life Event Screener” (PEARLS), facilitating early intervention. Recent studies have linked ACEs in children to compromised executive functioning,^{3,5} respiratory issues,³ immune/endocrine harm,^{3,4} asthma,^{3,6} infections,^{3,6} and learning difficulties.^{3,7} In adolescents, risks like obesity,⁸ violence,⁹ and smoking.¹⁰ These findings underscore the importance of early identification and intervention.

The link between ACEs and poor health may result from abnormal HPA axis functioning, assessed through cortisol and C-reactive protein (CRP).¹¹ This chronic stress response leads to heightened inflammation, increasing susceptibility to infections and autoimmune conditions.¹² Inflammatory and epigenetic markers, such as C-reactive protein and telomeres,¹³ are implicated in the long-lasting impact of ACEs, potentially influencing intergenerational transmission. Timely identification of ACEs is crucial to break the cycle of toxic stress.

While screening for ACEs is recommended by prominent health organizations, including the Center for Disease Control and Prevention (CDC),¹⁴ the American Academy of Pediatrics (AAP),⁴ and the World Health Organization (WHO),¹ there is currently a gap in research regarding prevalence and associations of ACEs with physical and psychological diseases in Brazilian children. Additionally, the absence of validated and standardized instruments in Brazilian Portuguese for ACE assessment highlights the need for validated tools that are culturally and contextually appropriate. The use of non-validated instruments can result in inaccurate assessments, leading to inappropriate interventions, which ultimately compromise the quality of care.

Given the vulnerability of the developing brain to adversities, early detection of ACEs is essential to prevent chronic toxic stress. Therefore, this pioneering study, the first outside the United States, aims to translate, culturally adapt, and validate the PEARLS questionnaire through the process of reliability testing, face validity, and gathering evidence based on content and internal structure. The goal is to establish the PEARLS-BR as a reliable tool for use in Brazilian pediatric practice, supporting the early identification of ACE-related diseases.

Materials and methods

The cultural adaptation of the PEARLS (Child, Teen, and Teen self-report versions) was conducted with authorization from the developers under a licensing agreement signed between the University of California San Francisco (UCSF), the copyright holder of the instrument, and the Universidade de Caxias do Sul (UCS). This research received approval from the UCS Research Ethics Committee (number 6.090.525).

Instruments

PEARLS

PEARLS is a self-applicable questionnaire designed to screen for ACEs in individuals from birth to 18 years old. The PEARLS Child and Teen versions have 17 questions, with two additional ones in the Teen version. The items assess sexual, physical, or emotional violence; neglect; parental mental illness, substance abuse, incarceration; separation/divorce; domestic violence, as well as food insecurity, housing instability, community violence, and discrimination. PEARLS Child and Teen are completed by a caregiver, while the PEARLS Teen Self-Report is completed by the adolescent. Scoring is based on the sum of affirmative responses, which can be interpreted either continuously - assessing ACEs, Related Life Events, or the total score for a detailed view of experiences - or categorized into groups (0, 1–3, 4+) to identify different levels of exposure.^{3,15}

PEARLS was developed and validated in the USA, showing good psychometric properties with reliability ($\alpha = 0.61-0.87$), factor loadings between 0.44 and 0.83, and a three-factor model (Maltreatment, Household Challenges, Social Context) confirmed via CFA with satisfactory fit indices ($\chi^2(116) = 139.68$, $p = .07$; RMSEA = 0.03; CFI = 0.99; TLI = 0.99).⁴

QUESI

The Childhood Trauma Questionnaire (CTQ), validated for the Brazilian population as the “*Questionário sobre Traumas na Infância*” (QUESI), is designed for adolescents (12+) and adults to rate the frequency of 28 childhood trauma experiences on a five-point Likert scale. It assesses sexual, physical, or emotional abuse, as well as emotional and physical neglect. Validation studies in Brazil, including CFA, confirmed appropriate factor structure ($\chi^2(270) = 1174.22$, $p < .0001$; CFI = 0.98; TLI = 0.98; RMSEA = 0.04) and internal consistency ($\alpha = 0.80$ to 0.91). In this study, QUESI was used to assess the convergent validity of the PEARL-BR, completed by caregivers and teenagers (13+).

Procedure

The study followed Borsa et al.’s six-stage model for cross-cultural adaptation and psychometric evaluation

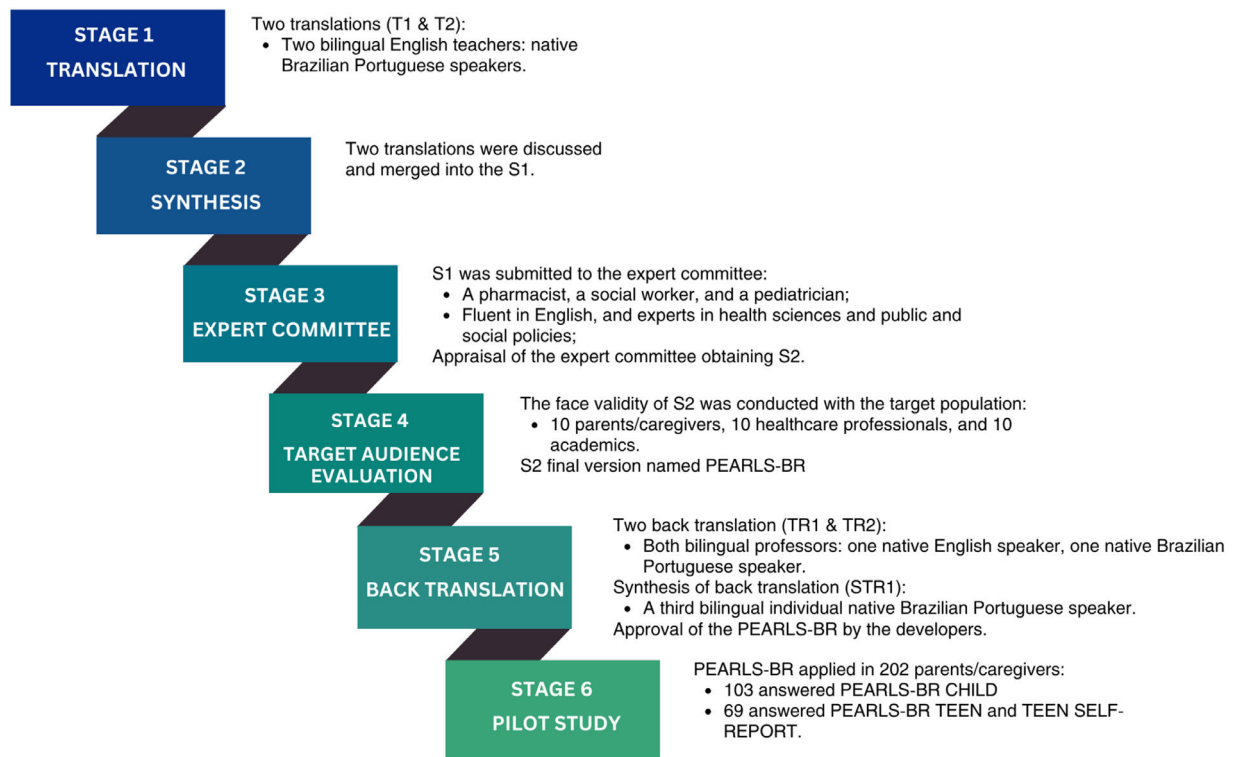


Figure 1 The graphical representation of stages for transcultural adaptation of PEARLS, adapted from Borsa et al. ^{16,a}
^aModified drawing from Pereira et al. ²⁷

104 (Figure 1).¹⁶ After the adaptation, a pilot cross-sectional
 105 study was conducted to evaluate the psychometric proper-
 106 ties of the instrument.

107 Evidence-based on content

108 The PEARLS was translated from English to Brazilian Portu-
 109 guese by two bilingual professors, whose native language is
 110 Portuguese, resulting in two translated versions (T1 and T2)
 111 that were merged into Synthesis 1 (S1).

112 The S1 was submitted to the appraisal of an expert com-
 113 mittee composed of a pharmacist, a social worker, and a
 114 pediatrician, selected based on their academic background,
 115 professional experience in health sciences, public policies,
 116 and social policies, as well as their proficiency in English.
 117 These experts were chosen for their relevant expertise in
 118 these fields, holding doctoral degrees, actively conducting
 119 research, and serving as permanent faculty members at a
 120 University in Brazil. Each specialist received individual
 121 instructions outlining the evaluation task (Supplementary
 122 Material 1) The content validity was analyzed by the
 123 experts, considering the four dimensions suggested by the
 124 literature: semantic, idiomatic, experiential, and
 125 conceptual.^{17,18} Additionally, aspects such as structure, lay-
 126 out, instrument instructions, comprehensiveness, and ade-
 127 quacy of expressions in each item were also evaluated.¹⁶
 128 They also compared the original instrument and the S1,
 129 ensuring the best fit with the context and experiences of
 130 Brazilian children and teens. Each expert submitted their
 131 evaluations with comments to the responsible researchers,
 132 and these evaluations were identified as J1, J2, and J3 (Sup-
 133 plementary Material 2). The committee collectively

discussed each suggestion for each item, arriving at a con- 134
 clusion together, successfully consolidating and obtaining 135
 synthesis 2 (S2). 136

The face validity was conducted with the target popula- 137
 tion to assess content validation and the overall meaning of 138
 S2. The instrument was evaluated not only by a convenience 139
 sample of individuals treated at a Multidisciplinary Health 140
 Care Center but also by healthcare professionals (nutrition- 141
 ist, pediatrician, pediatric resident, nephrology resident, 142
 pediatric neurologist, physical therapist, social worker, 143
 nurse technician, psychologist, and nurse) and academics 144
 from health sciences fields (medicine, nutrition, and physio- 145
 therapy). Including these professionals was essential as their 146
 insights provided valuable perspectives on the instrument's 147
 applicability and relevance within a clinical setting. This 148
 approach mirrors the methodology of the original PEARLS 149
 validation, which also included input from clinic providers 150
 and staff to ensure a breadth of response. A total of 30 par- 151
 ticipants were individually interviewed after signing the 152
 informed consent form. They evaluated the clarity, compre- 153
 hensibility, and adequacy of S2 using a structured feedback 154
 form (Supplementary Material 3). This form allowed partici- 155
 pants to assess each item of the instrument and suggest 156
 modifications, including potential synonyms or changes in 157
 wording to enhance the instrument's clarity and relevance. 158
 Based on the received suggestions and the analysis of the 159
 interviewees' feedback (Supplementary Material 4), the 160
 expert committee decided to maintain version S2 without 161
 significant alterations. 162

The version S2 of the instrument was translated back into 163
 English by two different translators. One translator is a bilin- 164
 gual professor whose native language is English (TR1), while 165

166 the other is a bilingual professor whose native language is
 167 Portuguese (TR2). This stage aimed to assess how well the
 168 translated version (S2) reflected the content of the original
 169 version. Two back translations of the instrument (TR1 and
 170 TR2) were obtained, and a third bilingual individual synthe-
 171 sized them into a document named S1TR. Thus, PEARLS-BR
 172 was obtained and had the approval of the developer.

173 Evidence-based on relationships with external 174 variables

175 The PEARL-BR pilot study took place from June 2023 to Janu-
 176 ary 2024 at a Multidisciplinary Health Care Center and a
 177 General Hospital-Reference Center for Child and Adolescent
 178 Care. The General Hospital, part of the 5th Regional Health
 179 Coordination of Rio Grande do Sul, covers 49 cities and
 180 approximately 1.2 million people. Families were recruited
 181 from a convenience sample in the waiting room, where care-
 182 givers signed consent forms and adolescents signed assent
 183 forms. The goal was to recruit 200 caregivers, who had to
 184 meet the following criteria: aged over 18, primary caregiver
 185 of a child aged 18 or younger, Brazilian Portuguese speaker,
 186 and not have another child in the study.

187 During the pilot study phase, participants completed the
 188 PEARL-BR questionnaire, and the QUESI, and answered soci-
 189 odemographic information. Specifically, parents of children
 190 aged 0 to 12 years responded to the PEARLS-BR Child ver-
 191 sion, while parents of children aged 13 to 18 years com-
 192 pleted the PEARLS-BR Adolescent version. Adolescents aged
 193 13 to 18 years answered the PEARLS-BR Adolescent Self-
 194 Report version. The QUESI was completed by all parents and
 195 by adolescents aged 13 years and older. Only the parents
 196 provided sociodemographic information. Following this,
 197 they responded to a five-point verbal rating scale (VRS)
 198 aimed at assessing the overall clarity of the instrument,
 199 with both parents and adolescents aged 13 and older com-
 200 pleting this rating. The pivotal query of this scale was: "Did
 201 you understand what was asked in the PEARLS-BR ques-
 202 tionnaire?" Scores ranged from a minimum of "1" ("no com-
 203 prehension") to a maximum of "5" ("complete comprehension").
 204 A score of three or below denoted inadequate understand-
 205 ing. Moreover, alongside caregivers, 10 healthcare profes-
 206 sionals recruited by a convenience sample from the
 207 Multidisciplinary Health Care Center also provided feedback
 208 through the VRS after signing the informed consent form.
 209 The test-retest reliability assessment, a key measure of reli-
 210 ability, was conducted 30 days after caregivers completed
 211 the PEARLS-BR in the pilot study, with the aim of obtaining a
 212 minimum of 50 retests.

213 Statistical analysis

214 All study data were collected and managed using REDCap
 215 (Research Electronic Data Capture), hosted at UCS.^{19,20} RED-
 216 Cap is a secure platform for research data capture. Statisti-
 217 cal analysis was conducted using R software (version 3.5.2).
 218 Continuous variables were expressed as median and inter-
 219 quartile range. Internal consistency was assessed with Cron-
 220 bach's alpha, where values above 0.75 indicated satisfactory
 221 consistency. The 95% confidence intervals for Cronbach's
 222 alpha were computed using the Duhachek method (PSYCH
 223 package). Comprehension and semantic equivalence were

evaluated with the VRS, with scores above three indicating
 adequate understanding. Kappa coefficients assessed content
 validity, with values over 0.60 considered satisfactory.
 Test-retest reliability was determined using Spearman's cor-
 relation, with values above 0.75 indicating reliable consis-
 tency.

Results

The stages and procedures for translation, adaptation, and
 validation followed the flow outlined in Figure 1. Supple-
 mentary Material 5 presents the instrument's items in their
 original versions, progressing through each phase until the
 final version.

To enhance clarity in the title, the term "adverse child-
 hood experiences" was chosen instead of the acronym
 "ACE's". In the original PEARLS, questions were in the pre-
 sent perfect tense, but since this tense does not exist in Bra-
 zilian Portuguese, the past perfect indicative was used to
 indicate that any past action should be considered positive
 in the response.

The expert committee raised eight points: seven on
 equivalence and one on layout. Four of these were modified
 resulting in S2 (final version), including layout adjustments
 with increased spacing while keeping the original PEARLS
 structure. Additionally, question 6 of part 1 was revised for
 semantic equivalence, and question 2 was expanded to
 include examples of mental illnesses. Question 9 of part 2
 was also revised to align with the original text. The other
 four points remained unchanged after analysis.

During the evaluation phase, 30 participants, including
 healthcare professionals, caregivers, and academics,
 reviewed each component of PEARLS-BR. Of these, 80%
 ($n = 24$) found the version clear and suitable for the Brazilian
 context, while 20% ($n = 6$) provided feedback leading to an
 item-by-item review. After consultations with the expert
 committee, version S2 was maintained without changes.
 The original PEARLS authors approved the PEARLS-BR version
 after considering nuances in Brazilian grammar and gender-
 specific endings.

To ensure the validity of the study, a pilot study was con-
 ducted involving the preliminary application of the instru-
 ment in a sample representing the target population. A total
 of 202 caregivers participated: 133 responded to the
 PEARLS-BR Child, while 69 completed the PEARLS-BR Teen,
 and 69 adolescents over 13 years old completed the PEARLS-
 BR Teen Self-Report. Throughout this process, the appropri-
 ateness of the items in terms of their meaning and compre-
 hensibility, as well as the instructions for test
 administration, was assessed. No adjustments were deemed
 necessary, indicating the readiness of the instrument for
 use. Table 1 presents the sociodemographic characteristics
 of the caregivers who completed the PEARLS-BR Child ver-
 sion, along with the characteristics of their children (ages
 0–12), as well as the caregivers who completed the PEARLS-
 BR Teen version. Additionally, it includes the sociodemo-
 graphic characteristics of the adolescents (ages 13–18) who
 completed the PEARLS-BR Teen Self-Report independently.
 This structure clarifies the distinct groups: caregivers
 reporting on their children, caregivers reporting on their

Table 1 Sociodemographic characteristics of caregivers and their children (PEARLS-BR Child) and caregivers and their adolescents (PEARLS-BR teen and teen self-report).

| Characteristics | PEARLS-BR CHILD version (n = 133) | | PEARLS-BR TEEN version (n = 69) | PEARLS-BR TEEN SELF-REPORT version (n = 69) |
|-------------------------------------|--------------------------------------|-----------|------------------------------------|--|
| | Caregivers | Children | Caregivers | Teens |
| Age, median (IQR) | 36 (28–42) | 7 (4–10) | 40 (34–47) | 14 (13–14) |
| Sex, n (%) | | | | |
| Male | 27 (20.3) | 54 (40.6) | 6 (8.7) | 13 (18.8) |
| Female | 106 (79.7) | 79 (59.4) | 63 (91.3) | 56 (81.2) |
| Ethnic-racial classification, n (%) | | | | |
| White | 82 (61.7) | 88 (66.2) | 41 (59.4) | 46 (66.7) |
| Black | 6 (4.6) | 3 (2.3) | 5 (7.2) | 6 (8.7) |
| Brown/Mixed-race | 42 (31.5) | 40 (30.1) | 22 (31.9) | 16 (23.1) |
| Indigenous | 3 (2.2) | 1 (0.7) | 1 (1.5) | 0 |
| Asian | 0 | 1 (0.7) | 0 | 1 (1.5) |
| undergraduate Degree | | | | |
| 0 | 0 | 20 (15.0) | 0 | 0 |
| 1 (0.7) | 1 (0.7) | 34 (25.6) | 0 | 0 |
| 7 (5.3) | 7 (5.3) | 58 (43.6) | 15 (21.7) | 1 (1.5) |
| 31 (23.3) | 31 (23.3) | 21 (15.8) | 19 (27.5) | 46 (66.7) |
| 81 (60.9) | 81 (60.9) | 0 | 32 (46.4) | 21 (30.3) |
| 11 (8.3) | 11 (8.3) | 0 | 3 (4.4) | 1 (1.5) |
| 2 (1.5) | 2 (1.5) | 0 | 0 | 0 |
| Caregiver-child relationship, n (%) | | | | |
| Father | 23 (17.3) | | 5 (7.2) | |
| Mother | 95 (71.4) | | 51 (73.9) | |
| Grandfather | 3 (2.2) | | 1 (1.5) | |
| Grandmother | 5 (3.8) | | 9 (13.0) | |
| Aunt | 5 (3.8) | | 1 (1.5) | |
| Others | 2 (1.5) | | 2 (2.9) | |
| Marital Status, n (%) | | | | |
| Single | 51 (38.4) | | 26 (37.7) | |
| Married | 42 (31.5) | | 19 (27.5) | |
| Civil Union | 21 (15.8) | | 15 (21.7) | |
| Separated | 15 (11.3) | | 5 (7.2) | |
| Widowed | 4 (3.0) | | 4 (5.9) | |
| Income (in R\$/per month) | | | | |
| 2589.00 or less | 76 (57.1) | | 41 (59.4) | |
| Greater than 2589.00 | 57 (42.9) | | 28 (40.6) | |
| Housing Type, n (%) | | | | |
| House | 112 (84.2) | | 65 (94.1) | |
| Apartment | 19 (14.3) | | 4 (5.9) | |
| Shared housing | 2 (1.5) | | 0 | |
| Number of rooms, median (IQR) | 5 (4–6) | | 6 (5–7) | |
| Number of cohabitants, median (IQR) | 4 (3–5) | | 4 (3–5) | |

282 teens, and the adolescents themselves providing self-
283 reports.

284 The VRS within the PEARLS-BR Child and Teen, as evalu-
285 ated by caregivers, demonstrated strong comprehension and
286 semantic equivalence, achieving a median score of 4 (IQR:
287 4–5). Similarly, adolescents completing the PEARLS-BR Teen
288 Self-Report rated the instrument similarly, with a median
289 score of 4 (IQR: 4–5). Additionally, ten healthcare profession-
290 als assessed comprehension and semantic equivalence,
291 yielding a median score of 5 (IQR: 4–5).

Measurement of internal consistency, as assessed through
292 Cronbach's alpha, revealed high reliability across all versions
293 of PEARLS-BR. Specifically, the Child version exhibited an
294 alpha coefficient of 0.81 (95% CI: 0.77–0.86), the Teen ver-
295 sion 0.79 (95% CI: 0.72–0.85), and the Teen Self-Report ver-
296 sion 0.78 (95% CI: 0.71–0.85).
297

298 At the outset of this analysis, it is pertinent to clarify that
299 the levels of agreement are being assessed in accordance
300 with the QUESI. The convergent validity, assessed using
301 Kappa, indicated varying degrees of agreement for the

emotional abuse construct across different versions of the instrument: moderate agreement (0.50) for the Child version, fair agreement (0.33) for the Teen version, and moderate agreement (0.51) for the Teen Self-Report version. Similarly, moderate agreement was observed for the physical abuse construct across all versions, with values of 0.52, 0.47, and 0.49 for the Child, Teen, and Teen Self-Report versions, respectively. Regarding the sexual abuse construct, substantial agreement (0.67, 0.79) and almost perfect agreement (0.83) were noted across the same versions. Furthermore, the physical neglect construct showed slight agreement (0.17, 0.15) for the Child and Teen versions, and fair agreement (0.26) for the Teen Self-Report version. The instrument used to make these comparisons measures slightly different outcomes, thereby providing additional context for interpreting the agreement levels.

The test-retest reliability results from the Spearman test demonstrated a strong positive and statistically significant agreement between the initial and subsequent responses, obtained after a 30-day interval. Specifically, for the PEARLS-BR Child version, $\rho=0.91$; for the PEARLS-BR Teen version, $\rho=0.90$; and for the PEARLS-BR Teen self-report version, $\rho=0.94$. In this phase, a total of 61 participants were involved, with 43 responding to the Child version and 18 to the Teen and Teen Self-Report versions, respectively.

The final version of PEARL-BR Child is available in Supplementary Material 6, while PEARLS-BR Teen can be found in Supplementary Material 7, and PEARLS-BR Teen Self-Report is available in Supplementary Material 8.

Discussion

This study presents the Brazilian Portuguese version of PEARLS, tailored for screening ACEs from birth to eighteen years in Brazil, following a rigorous process of translation, cultural adaptation, and validation.^{17,18} The methodology adhered to guidelines proposed by Borsa et al.,¹⁶ previously successful in Brazil for translating and validating several instruments.²¹⁻²³

The PEARLS-BR addresses a critical gap in screening ACEs within the Brazilian population, focusing specifically on individuals aged from birth to eighteen years old, unlike other tools limited to those above 12 years. The involvement of caregivers and healthcare professionals was crucial for refining the screener. Engaging with diverse stakeholders ensured semantic, idiomatic, and conceptual equivalence, making the tool comprehensible and applicable to the target population. The VRS, which measured comprehension and semantic equivalence, was also adequate for the tool's face validity.

The PEARLS-BR demonstrated satisfactory internal consistency and strong test-retest reliability across all three versions, indicating robust psychometric properties. These results are consistent with the psychometric analyses of the original PEARLS, which also showed high internal consistency and reliability.^{1,4} The PEARLS-BR effectively identified traumatic experiences during childhood and adolescence, particularly in cases of sexual abuse in the Teen Self-Report version.

QESI was used in the convergent validity analysis, focusing on specific types of maltreatment,^{24,25} while PEARLS

assesses a broader range of ACEs, including household challenges.^{1,4} The findings indicate moderate to substantial agreement between the two instruments, particularly regarding sexual and physical abuse, reinforcing the convergent validity of the PEARLS-BR. These results align with the psychometric performance of PEARLS in the USA, confirming its utility for screening ACEs in Brazilian children and adolescents.

Despite data collection being limited to southern Brazil, the PEARLS-BR can be used nationwide due to its rigorous validation process, consistent with other Brazilian scales.^{16,21-23} The tool's reliability and applicability in diverse healthcare settings facilitate open communication and comfortable disclosure of sensitive information.

The PEARLS-BR serves as a practical tool for healthcare professionals in primary care settings, aiming to screen ACEs for children and adolescents. This instrument, similar to the original PEARLS, is not intended for psychodiagnostics but rather as a valuable resource for professionals who may lack access to specialized psychology or social services.¹ It also serves as a valuable research instrument, facilitating studies aimed at understanding and addressing ACEs in diverse populations.

Further research is needed to develop treatments and interventions for ACEs. Routine screening can provide crucial data to assess the economic burden of ACEs,²⁶ and guide investment in strategies to improve population health. However, the limitations of this study were the absence of confirmatory factor analysis (CFA) and measurement invariance testing, which limits the ability to fully validate the factor structure of the PEARLS-BR across different subgroups, such as age or gender. Future studies should focus on conducting CFA and assessing measurement invariance across diverse populations to validate construct validity.

Pearls-BR underwent a successful translation into Brazilian Portuguese, along with cultural adaptation and validation, enabling its utilization for assessing ACEs within the pediatric Brazilian population.

Funding sources

L.B. was supported by CAPES: "This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001".

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

To the professors S.B. Fadanelli, M. V. S. da Silva, S. S. Marchett, E. M. B. Basso, E. Ging from UCS Witting Center who helped with all the translation and back translations process. To the medical students E. T. Rotta and G. S. Schramm for the help in the data collection. The authors also thank the patients and their parents/caregivers who participated in this study.

413 **Supplementary materials**

414 Supplementary material associated with this article can be
415 found, in the online version, at [doi:10.1016/j.](https://doi.org/10.1016/j.jpmed.2024.10.003)
416 [jpmed.2024.10.003](https://doi.org/10.1016/j.jpmed.2024.10.003).

417 **References**

- 418 1. Koita K, Long D, Hessler D, Benson M, Daley K, Bucci M, et al.
419 Development and implementation of a pediatric adverse child-
420 hood experiences (ACEs) and other determinants of health
421 questionnaire in the pediatric medical home: a pilot study. *PLoS*
422 *ONE*. 2018;13:e0208088.
- 423 2. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM,
424 Edwards V, et al. Relationship of childhood abuse and household
425 dysfunction to many of the leading causes of death in adults.
426 The Adverse Childhood Experiences (ACE) study. *Am J Prev Med*.
427 1998;14:245–58.
- 428 3. Thakur N, Hessler D, Koita K, Ye M, Benson M, Gilgoff R, et al.
429 Pediatrics adverse childhood experiences and related life
430 events screener (PEARLS) and health in a safety-net practice.
431 *Child Abuse Negl*. 2020;108:104685.
- 432 4. Ye M, Hessler D, Ford D, Benson M, Koita K, Bucci M, et al. Pedi-
433 atric ACEs and related life event screener (PEARLS) latent
434 domains and child health in a safety-net primary care practice.
435 *BMC Pediatr*. 2023;23:367.
- 436 5. Bucci M, Marques SS, Oh D, Harris NB. Toxic stress in children
437 and adolescents. *Adv Pediatr*. 2016;63:403–28.
- 438 6. Wing R, Gjelsvik A, Nocera M, McQuaid EL. Association between
439 adverse childhood experiences in the home and pediatric
440 asthma. *Ann Allergy Asthma Immunol*. 2015;114:379–84.
- 441 7. Bethell CD, Newacheck P, Hawes E, Halfon N. Adverse childhood
442 experiences: assessing the impact on health and school engage-
443 ment and the mitigating role of resilience. *Health Aff (Mill-*
444 *wood)*. 2014;33:2106–15.
- 445 8. Zhang Y, Li Y, Jiang T, Zhang Q. Role of body mass index in the
446 relationship between adverse childhood experiences, resil-
447 ience, and mental health: a multivariate analysis. *BMC Psychia-*
448 *try*. 2023;23:460.
- 449 9. Forster M, Gower AL, McMorris BJ, Borowsky IW. Adverse child-
450 hood experiences and school-based victimization and perpetra-
451 tion. *J Interpers Violence*. 2017;35:662–81.
- 452 10. Parks MJ, Davis L, Kingsbury JH, Schlafer RJ. Adverse childhood
453 experiences and youth cigarette use in 2013 and 2016: emerging
454 disparities in the context of declining smoking rates. *Nicotine*
455 *Tob Res*. 2020;22:124–9.
- 456 11. Dempster KS, O’Leary DD, MacNeil AJ, Hodges GJ, Wade TJ.
457 Linking the hemodynamic consequences of adverse childhood
458 experiences to an altered HPA axis and acute stress response.
459 *Brain Behav Immun*. 2021;93:254–63.
- 460 12. De La Rosa R, Zablony D, Ye M, Bush NR, Hessler D, Koita K,
461 et al. Biological burden of adverse childhood experiences in
462 children. *Psychosom Med*. 2023;85:108.
- 463 13. Lang J, McKie J, Smith H, McLaughlin A, Gillberg C, Shiels PG,
464 et al. Adverse childhood experiences, epigenetics and telomere
length variation in childhood and beyond: a systematic review
of the literature. *Eur Child Adolesc Psychiatry*.
2020;29:1329–38.
- 465 14. Preventing adverse childhood experiences (ACEs): leveraging
466 the best available evidence; 2019. [Accessed Feb 25, 2024].
467 Available from: <https://stacks.cdc.gov/view/cdc/82316>
- 468 15. Koita K, Long D, Hessler D, Benson M, Daley K, Bucci M, et al.
469 Development and implementation of a pediatric adverse child-
470 hood experiences (ACEs) and other determinants of health
471 questionnaire in the pediatric medical home: a pilot study. *PLoS*
472 *ONE*. 2018;13:e0208088.
- 473 16. Borsa JC, Damásio BF, Bandeira DR. Cross-cultural adaptation
474 and validation of psychological instruments: some considera-
475 tions. *Paidéia (Ribeirão Preto)*. 2012;22:423–32.
- 476 17. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for
477 the process of cross-cultural adaptation of self-report meas-
478 ures. *Spine (Phila Pa 1976)*. 2000;25:3186–91.
- 479 18. Guillemin F, Bombardier C, Beaton D. Cross-cultural adapta-
480 tion of health-related quality of life measures: literature
481 review and proposed guidelines. *J Clin Epidemiol*.
482 1993;46:1417–32.
- 483 19. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O’Neal L,
484 et al. The REDCap consortium: building an international com-
485 munity of software platform partners. *J Biomed Inform*.
486 2019;95:103208.
- 487 20. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG.
488 Research electronic data capture (REDCap)—a metadata-driven
489 methodology and workflow process for providing translational
490 research informatics support. *J Biomed Inform*.
491 2009;42:377–81.
- 492 21. Borsa JC, Bandeira DR. [Cross-cultural adaptation of peer
493 aggressive and reactive behaviors questionnaire in Brazil].
494 *Psico-USF*. 2014;19.
- 495 22. Patias ND, Machado WD, Bandeira DR, Dell’Aglio DD.
496 [Depression anxiety and stress scale (DASS-21) - short form:
497 adaptation and validation for Brazilian adolescents]. *Psico-*
498 *USF*. 2016;21.
- 499 23. Donat JC, Lobo N dos S, Jacobsen G dos S, Guimarães ER, Kris-
500 tensen CH, Berger W, et al. Translation and cross-cultural adap-
501 tation of the international trauma questionnaire for use in
502 Brazilian Portuguese. *Sao Paulo Med J*. 2019;137:270–7.
- 503 24. Grassi-Oliveira R, Stein LM, Pezzi JC. [Translation and content
504 validation of the childhood trauma questionnaire into Portu-
505 guese language]. *Rev Saude Publica*. 2006;40:249–55.
- 506 25. Grassi-Oliveira R, Cogo-Moreira H, Salum GA, Brietzke E, Viola
507 TW, Manfro GG, et al. Childhood trauma questionnaire (CTQ) in
508 Brazilian samples of different age groups: findings from confir-
509 matory factor analysis. *PLoS ONE*. 2014;9:e87118.
- 510 26. Peterson C, Aslam MV, Niolon PH, Bacon S, Bellis MA, Mercy JA,
511 et al. Economic burden of health conditions associated with
512 adverse childhood experiences among US adults. *JAMA Netw*
513 *Open*. 2023;6:e2346323.
- 514 27. Pereira RP, Leitão AQ, Fotakos GS, Neves dos Reis J, Rocha FE,
515 Machado MG, et al. Pediatric incontinence questionnaire
516 (PINQ): translation and transcultural adaptation to Brazilian
517 Portuguese. *J Pediatr (Rio J)*. 2023;99:379–84.