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Research

Turkish Cross-cultural Adaptation of the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS)

Aylin Kurt PhD, RN[a,*], Fatma Dinç PhD, RN[a], Emine Güneş Şan Msc, RN[a], Tülin Kurt Alkan Msc, RN[b]

[a] Nursing Department, Faculty of Health Sciences, Bartın University, Bartın, Turkey
[b] Department of Surgical Nursing, Institute of Health Sciences, Zonguldak Bülent Ecevit University, Zonguldak, Turkey

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A B S T R A C T

Purpose: The purpose of this study is to cross-culturally adapt the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS) to Turkish and test its validity and reliability.
Design: This is a methodological study.
Methods: This study was conducted with 121 children aged 1 to 12 years who underwent ambulatory surgery. The data of the study were collected using a Descriptive Information Form, PHBQ-AS, and the Parents' Postoperative Pain Measure. Data analysis and evaluation were performed using factor analysis, Cronbach's α analysis, item-total score correlation analysis, content validity, construct validity, and concurrent validity.
Findings: PHBQ-AS showed a high level of internal consistency (Cronbach's α = 0.801). The item-total correlation values of PHBQ-AS were found to be 0.458 to 0.753. PHBQ-AS was determined to be a single-factor scale explaining 66% of the variance in the examined variable. PHBQ-AS and Parents' Postoperative Pain Measure scores were moderately correlated.
Conclusions: The Turkish version of PHBQ-AS was highly valid and reliable for the Turkish population. A recommendation for health care professionals in Turkey is to use the PHBQ-AS scale to evaluate post-hospitalization behavioral changes in children who are admitted for ambulatory surgery.
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Ambulatory surgery is preferred for operations in the genital and inguinal regions such as circumcision and the repair of undescended testicles and hernias, as it is simple and takes a short time in children.[1] After surgery, changes in the behaviors of children may develop.[2,3] While delirium is an acute behavioral change after surgery in children, delayed behavioral changes include sleep and eating disorders, tantrums, nightmares, and anxiety disorders.[4] Post-hospitalization behavioral changes can develop in more than 50% of children, especially those who have undergone general anesthesia.[5] Behavioral changes usually last for 2 to 4 weeks, but they can persist for up to 12 months.[6,7] The persistence of these effects for a long time may make it more difficult for children to obtain medical care later and influence their development negatively.[8]

The Post Hospital Behavior Questionnaire (PHBQ) was developed by Vernon et al[9] to measure behavioral changes in children hospitalized for surgery or illness. The scale includes 27 items rated by parents. The long-term validity, reliability, and psychometric properties of PHBQ have not been tested. This limits the usage of the scale.[10] Therefore, to eliminate the difficulties of using PHBQ, Jenkins et al[11] assessed the scale again for perioperative settings as the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS). After the reevaluation of the psychometric properties of the scale, the number of items in PHBQ-AS was reduced from 27 to 11. PHBQ-AS showed good internal consistency, reliability, and concurrent validity.[11]

In Turkey, there is no measurement instrument assessing surgery-related behavioral changes in children. Jenkins et al[11] used the Functional Disability Inventory (FDI) as a parallel form for PHBQ-AS.[8,12] However, there is no Turkish adaptation of FDI. Nevertheless, there is an adapted Turkish version of the Parents' Postoperative Pain Measure (PPPM), which was developed by Chambers et al[13] to assess pain by the evaluation of behavioral changes in children in the postoperative recovery period by their parents like PHBQ-AS.[14] Notwithstanding, as a result of this evaluation, this measurement instrument provides information about pain. There is a need for a measurement instrument in Turkish that evaluates behavioral changes in children in the post-operative period and provides data about behaviors.

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* Address correspondence to: Aylin Kurt, Nursing Department, Faculty of Health Sciences, Bartın University, Bartin 74100, Turkey.
E-mail address: akurt@bartin.edu.tr (A. Kurt).

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In this methodological study, we aimed to cross-culturally adapt the PHBQ-AS developed by Jenkins et al[11] and test the validity and reliability of the Turkish version. For this general objective, answers were sought to the following research questions:

- Is the Turkish version of PHBQ-AS a valid instrument?
- Is the Turkish version of PHBQ-AS a reliable instrument?

Method

Ethics

For the Turkish adaptation of PHBQ-AS, permission was received from Brooke N. Jenkins via email. Written permissions were obtained from the Ethics Committee of a University (Protocol no: 2022-SBB-0420, decision date: 12.10.2022, meeting no: 23), and the institution where the study would be carried out. The objective and scope of the study were explained to each child's parents, and their written consent was received. Participation in the study was voluntary. The parents who agreed to participate were informed that they could withdraw from the study any time they wanted. However, no parent left the study throughout the study period.

Participants

This study was carried out with the parents of children aged between 1 to 12 years who underwent ambulatory surgery at the pediatric surgery inpatient clinic of an obstetrics and pediatrics hospital in the Western Black Sea Region of Turkey. The sample was selected using the simple random sampling method. The inclusion criteria were as follows: (1) Having a child aged 1 to 12 years, (2) having the child undergo an ambulatory surgical procedure, (3) voluntarily agreeing to participate in the study, and (4) filling out the data collection forms and attending the follow-ups completely. In cross-cultural scale adaptation studies, the recommendation is that the sample size is at least 5 to 10 times the number of items on the scale.[15] The fact that PHBQ-AS included 11 items indicated that a sample of 110 participants would be sufficient. The study was completed with 121 participants.

Data Collection

The data were collected between November 2022 and September 2023. The participants responded to PHBQ-AS on the postoperative first (T1), second (T2), and third (T3) days. In the validity and reliability analyses of PHBQ-AS, the data obtained on the second day of the postoperative period were used. This was because the period when children are the most likely to display behavioral changes after surgery is the first day when they return home from the hospital, and the original scale development study also analyzed data obtained on the second postoperative day.[11,16]

Descriptive Information Form

The form consisted of questions about the age, gender, and type of surgery of the children.

Post Hospitalization Behavior Questionnaire for Ambulatory Surgery

PHBQ-AS is a scale that was created by Jenkins et al[11] by the reevaluation of the psychometric properties of the original PHBQ, which was previously developed by Vernon et al,[9] for the assessment of the postoperative behaviors of children aged 1 month to 16 years by their parents. PBHQ-AS is a scale consisting of a single factor and 11 items, each of which is rated on a 5-point Likert-type scale: much less than before (1), less than before (2), same as before (3), more than before (4), and much more than before (5). For each item, parents are asked to compare the behaviors of their children before and after their children were admitted to the hospital. The score range of PHBQ-AS is 11 to 55. Higher scores indicate more negative behaviors displayed by the child.[11]

Parents' Postoperative Pain Measure

The scale was developed by Chambers et al[13] to determine pain in children after surgery based on the assessments of their parents and was adapted into Turkish by Seval and Kurt.[14] The PPPM includes 15 questions on the behaviors of children in the postoperative period in contexts such as eating, playing, complaining, whining, and wanting one's parents to be close. The score range of PPPM is 0 to 15. Higher scores indicate higher severity of pain. PPPM was used as the parallel form in this study to test concurrent validity because it is similar to PHBQ-AS in that the scope of its items is behavioral characteristics.

Cross-cultural Adaptation

We used a checklist for the cross-cultural adaptation of PHBQ-AS. This checklist consisted of the steps of the translation of the original form into Turkish, its back-translation into English, the synthesis of the translated version of the form, expert assessments, pilot tests, and pretests.[17,18]

Translation and Back-translation of PHBQ-AS

The scale was translated into Turkish by three bilingual and bicultural translators who were independent of the study process, were native speakers of English, and had experience regarding the grammatical and cultural aspects of English. Each translator performed the translations independently and without the knowledge of one another. Afterward, they combined their translations into a single form by exchanging their opinions and assessments. These three translators back-translated the final form of the scale, which they prepared without knowledge of the text of the original scale, into English.

Synthesizing the Translated Version

At this stage, the three translators exchanged ideas to synthesize their translation outputs. The process started from the original form of the scale, and all documents were synthesized by considering the translations of all translators. A final, single translation was created.

Expert Committee Review

The scale form was submitted for the opinions of experts in terms of content and construct validity. Opinions were collected from a total of nine experts, consisting of four faculty members at the Department of Pediatrics, three faculty members at the Department of Psychiatric Nursing, a pediatrics specialist, and a pediatric development specialist. The experts were shown the original and translated forms of the scale. They were asked to rate the items using a scoring system of 1 (irrelevant) to 4 (highly relevant). The agreement among the expert opinions was analyzed. Item-level content validity ratio (CVR) values and a scale-level content validity index (CVI) value were calculated for PHBQ-AS.[19,20] The experts found the Turkish and English forms of the scale relevant. The final version of the scale was reviewed by linguistics experts.

Pilot Testing of PHBQ-AS

The parents of 20 children 1 to 12 years of age who underwent surgeries were included in the pilot implementation of PHBQ-AS. The researchers contacted the parents in person, and the forms were filled out face-to-face. The parents were asked to fill out the forms and comment on words and sentences that they thought were difficult to understand. The researchers then examined the unclear

words and items identified in the pilot implementation and collected expert opinions again. The final form was decided based on the subjective judgments of the researchers after their discussions with the experts.

Statistical Analysis

The validity and reliability analyses of PHBQ-AS were carried out using the SPSS (Statistical Package for the Social Sciences) Version 22.0 package program. Descriptive statistics included frequencies, percentages, and mean values. CVR and CVI analyses were conducted to test content validity.[19,20] To determine whether the dataset was suitable for factor analyses, Bartlett's test of sphericity and the Keiser-Meyer-Olkin test were used. An explanatory factor analysis (EFA) was carried out. The EFA was performed with the principal component analysis method. The confirmatory factor analysis (CFA) method was used to confirm the construct that was obtained as a result of the EFA.[21,22] Internal consistency analyses were carried out using Cronbach's α coefficient.[23] Pearson's correlation analysis was used to investigate the concurrent validity between PHBQ-AS and PPPM. However, as PPPM is suitable for the age group of 7 to 12, the data of 53 children were used in the test. In the interpretations of the results of all analyses, $P < .05$ was accepted to be statistically significant.

Results

Children's Characteristics

The majority (64.5%) of the children were male; the mean age of all children was 9.14 ± 2.18 years (1 to 12 years). The ambulatory surgical operations of the children were adenotonsillectomy for 38.9% of the children, circumcision for 34.8%, urethral dilation for 14.1%, tongue tie repair for 7.4%, and hernia repair for 4.8% (Table 1).

Content Validity

The opinions of nine experts were obtained to test the content validity of PHBQ-AS. The CVR of the items was found to be in the range of 0.65 to 1.00. The CVI of the scale was found to be 0.85.

Construct Validity

The principal component analysis method was used to test the construct validity of the scale. The Keiser-Meyer-Olkin statistic was calculated as 0.767. The χ^2 value in Bartlett's test of sphericity was 132.191, and it was statistically significant ($P < .001$). PHBQ-AS was determined to have a single-factor structure (Figure 1). This single-factor structure explained 66% of the total variance in the measured variable (Table 2).

Table 1
Characteristics of Children (N = 121)

Characteristics	n (%)
Gender of the child	
Female	43 (35.6)
Male	78 (64.5)
Type of surgery	
Hernia	6 (4.8)
Urethral dilation	17 (14.1)
Circumcision	42 (34.8)
Tongue tie	9 (7.4)
Adenotonsillectomy	47 (38.9)
Total	121 (100.0)
Age of the child (year)	Mean ± SD: 9.14 ± 2.18 (1 to 12)

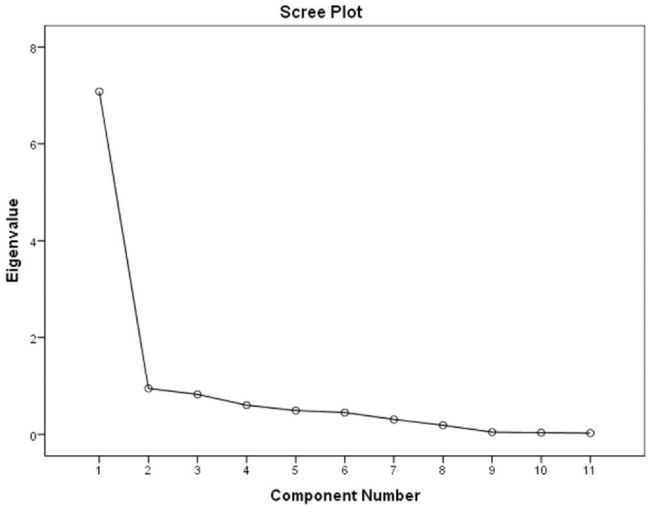

Figure 1. Slope of scree plot. Note: Showing that the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery has a factor with an eigenvalue greater than 1.

According to the CFA (Figure 2), the following goodness-of-fit indices (GFIs) were obtained: $\chi^2/df = 1.41$, root mean square error of approximation = 0.005, standardized root mean square residual = 0.003, normed fit index = 0.92, comparative fit index = 0.93, adjusted GFI = 0.95, and GFI = 0.91. These GFI values showed a very good fit.

Reliability

The Cronbach's α coefficient for PHBQ-AS was found as 0.801. The item-total score correlation coefficients for the 11 items were between 0.458 and 0.753 (Table 2).

Concurrent Validity

PHBQ-AS was moderately correlated with PPPM at T1 (r = 0.422, $P = .002$), T2 (r = 0.417, $P = .002$), and T3 (r = 0.395, $P = .003$) (Table 3).

Discussion

This study was carried out to perform the cross-cultural adaptation of PHBQ-AS and test its validity and reliability in Turkish. In the study, the scale was determined to have a single-factor structure which explained 66% of the total variance in the measured variable. Based on the results, the scale had a high level of internal consistency (Cronbach's α coefficients = 0.801). Jenkins et al[11] also found the Cronbach's α coefficient of the scale as 0.80. These results showed that PHBQ-AS was highly valid and reliable for the Turkish population.

EFA and CFA were used to test the construct validity of the scale. The results of the EFA demonstrated an 11-item and single-factor scale. Because the factor load values of all items were determined to be greater than 0.40, no item was removed as a result of the EFA. The GFIs of the scale that were calculated using the CFA method revealed that the tested model had a very good fit (greater than 0.90).[24] A comparison to the original study could not be made as Jenkins et al[11] did not report GFIs in their study.

As FDI,[12] which was used in the original study to test the concurrent validity of the scale, did not have a Turkish version tested for validity and reliability, the relationship between PHBQ-AS and PPPM, which evaluates behavioral changes after surgery, was examined in this study. In the literature, the relationship between postoperative pain and postoperative behavioral changes is still under debate.[25] Nevertheless, failing to manage postoperative pain well can contribute to behavioral changes.[26,27] Therefore, in this

Table 2
Explanatory Factor Analysis and Internal Consistency Analysis Results for PHBQ-AS† (N = 121)

Items	KMO	Bartlett's Test of Sphericity	Variance Explained by Factor	Factor Load (EFA)	Item-total Correlation	Cronbach's α
1. Does your child make a fuss about eating?	0.767	X^2: 132.191*	66.182	0.593	0.744	0.801
2. Does your child spend time just sitting or lying and doing nothing?				0.580	0.730	
3. Is your child uninterested in what goes on around him/her?				0.591	0.745	
4. Does your child get upset when you leave him/her alone for a few minutes?				0.484	0.621	
5. Does your child need a lot of help doing things?				0.403	0.458	
6. Is it difficult to get your child interested in doing things (like playing games with toys)?				0.576	0.721	
7. Does your child have temper tantrums?				0.564	0.753	
8. Is it difficult to get your child to talk to you?				0.501	0.658	
9. Does your child have bad dreams at night or wake up and cry?				0.475	0.615	
10. Does your child have trouble getting to sleep at night?				0.592	0.749	
11. Does your child have a poor appetite?				0.432	0.544	

PHBQ-AS, Post Hospitalization Behavior Questionnaire for Ambulatory Surgery; KMO, Keiser-Meyer-Olkin, EFA, explanatory factor analysis,
†The data were obtained in the measurements made on the second postoperative day.
* $P < .05$.

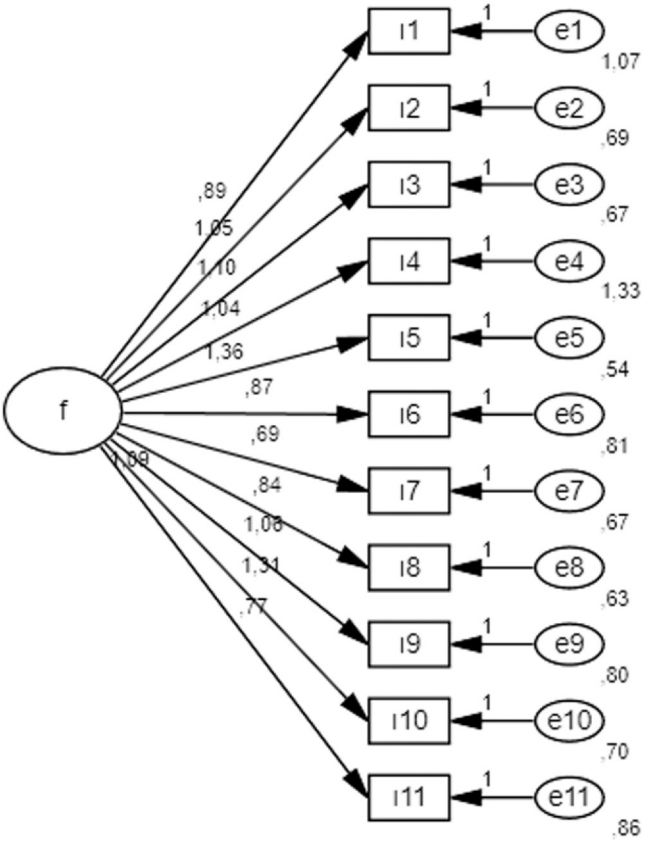

Figure 2. Path diagram. Note: Based on confirmatory factor analysis results and the standardized factor loadings for the hypothesized model.

study, it was assumed that there would be a positive relationship between PHBQ-AS and PPPM scores. According to the results of the analyses, there was a positive and moderate correlation between the scores of these scales. Jenkins et al[11] reported a positive and moderate correlation between PHBQ-AS and FDI.

The item-total score correlation coefficients of PHBQ-AS that were found in this study were greater than 0.45. The item-total score correlation coefficient of an item represents the relationship between the scores of the item in question and those of all remaining items. A low coefficient indicates that the contribution of the item to the overall scale is small.[28] Accordingly, all items on the scale showed good correlations.[29] Item-total score correlation coefficients were not reported in other cross-cultural adaptation studies of PHBQ-AS and in the original study.[9,11,30,31]

Considering that ambulatory surgery procedures are highly frequently performed on children, there is a great need for measurement instruments like PHBQ-AS.[2,3] Therefore, it is believed that PHBQ-AS, whose validity and reliability were tested in this study, will be used frequently, and it will be useful in the monitoring and assessment of behavioral changes that can develop in children after surgery.[11] Some differences and advantages of PHBQ-AS in comparison to PPPM should be noted. PPPM is a measurement instrument rated by parents including behavior-related statements that are used to evaluate postoperative pain. PPPM does not directly provide data on behavioral changes as a result of its interpretation.[13,14] The usage area of PHBQ-AS is considered to be broader as it covers a broader scope and assesses different behavioral changes, including those that could be associated with pain.[11]

Strengths and Limitations

The prevalence of ambulatory surgeries in children is steadily increasing due to the rapid development of new surgical methods

Table 3
Correlations Between PHBQ-AS and PPPM Based on the Measurement Times

Scales and Assessment Times	PHBQ-AS at T1 (n = 53)	PHBQ-AS at T2 (n = 53)	PHBQ-AS at T3 (n = 53)
PPPM at T1	r = 0.422, $P = .002$	NA	NA
PPPM at T2	NA	r = 0.417, $P = .002$	NA
PPPM at T3	NA	NA	r = 0.395, $P = .003$

PHBQ-AS, Post Hospitalization Behavior Questionnaire for Ambulatory Surgery; PPPM, Parents' Postoperative Pain Measure; T1, first day after surgery; T2, second day after surgery; T3, third day after surgery; NA, not applicable at this time point.
n = between the ages of 7 and 12 among the participants.

and advances in technology. During the postoperative period that follows surgical procedures and exposure to anesthesia, children may show certain behavioral changes including disorders such as sleep, eating, anxiety, regression, and enuresis (involuntary urination).[10,32–34] To evaluate postsurgical behavioral changes in Turkey after ambulatory surgery, it is expected that this scale, which has been tested for its validity and reliability in Turkish, will be frequently used. The study is strengthened by the inclusion of children aged 1 to 12 years who underwent various ambulatory surgical procedures as part of the administered scale. In addition, it is believed that the scale's low number of items facilitates ease of use for both children and parents.

Despite its strengths, this study also had some limitations. Adaptation studies were conducted for the original version of the scale (PHBQ) in different cultures (Germany and Sweden).[30,31] However, such an intercultural comparison could not be made due to the unavailability of a cross-cultural adaptation of PHBQ-AS, which was revised by Jenkins et al,[11] in different languages.

Conclusions

The Turkish version of the scale that was developed by Vernon et al[9] and revised by Jenkins et al[11] is a highly valid and reliable measurement instrument for the Turkish population. A recommendation for health care professionals in Turkey is to use the PHBQ-AS scale to evaluate posthospitalization behavioral changes in children who are admitted for ambulatory surgery. Further studies are recommended to validate the extension of PHBQ-AS to the 13 to 18 year old. Other cross-cultural adaptation studies can also be conducted for the scale.

Declaration of Competing Interest

None to report.

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