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Turkish Validity and Reliability Study of the Pediatric Comfort Assessment Scale

Pediatrik Konfor Değerlendirme Ölçeği'nin Türkçe Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Objective: In this study, it was aimed to adapt the "Pediatric Comfort Assessment Scale (PCAS)" to Turkish.

Methods: It is a methodological research. The research was carried out between September 2018 and September 2019. The population of the study consisted of children receiving treatment and care in pediatric units of a Foundation University's Health Group in Istanbul, and the sample group, who did not have congenital anomalies and did not take analgesics. "The Child's Descriptive Information Form", "Pediatric Comfort Assessment Scale", "FLACC (Face, Legs, Activity, Cry, Consolability) Pain Scale" and "Visual Analogue was composed of 256 children whose consent was obtained from their parents, who were in 1 month-18 years age Scale VAS)" were used to collect data. Validity and reliability analyses were made in the evaluation of research data.

Results: In accordance with the expert opinion, content validity ratios were calculated separately for all items of the scale and the overall content validity index was found to be 0.97. Confirmatory Factor Analysis Index Values of the Comfort Scale were found as $\chi 2/sd=3.21$; GFI=0.90; AGFI= 0.91; CFI=0.90; RMSEA=0.07; SRMR=0.07. When the standardized coefficients were examined, it was determined that the factor loadings of the scale items were high, the standard error values were low, the t-values were significant ($p <0.001$), and the R^2 values were high. Average Variance Extracted (AVE) values of PCAS subgroups were ≥.50 while composite reliability (CR) values were found to be greater than 0.7. The Cronbach's Alpha value was 0.81.

Conclusion: It is concluded that the Pediatric Comfort Assessment Scale is a valid and reliable tool in Turkish that can be used in the assessment of children's comfort.

Keywords:
Pediatric; comfort; scale; validity; reliability.

Anahtar Sözcükler:
Pediatrik; konfor; ölçek; geçerlik; güvenilirlik

ÖZ

Amaç: Bu çalışmada "Pediatrik Konfor Değerlendirme Ölçeği'nin (PCAS)" Türkçe'ye uyarlanması amaçlanmıştır.

Yöntem: Metodolojik bir araştırmadır. Araştırma Eylül 2018 ile Eylül 2019 tarihleri arasında gerçekleştirilmiştir. Araştırmanın evrenini İstanbul'da bulunan Vakıf Üniversitesi Sağlık Grubu'na bağlı pediatri birimlerinde tedavi ve bakım gören çocuklar, örneklemini ise 1 ay-18 yaş grubundaki ebeveynlerinden onam alınmış, doğumsal anomalisi olmayan ve analjezik kullanmayan 256 çocuk oluşturmuştur. Verilerin toplanmasında "Çocuğu Tanımlayıcı Bilgi Formu", "Pediatrik Konfor Değerlendirme Ölçeği", "FLACC (Yüz, Bacaklar, Aktivite, Ağlama, Teselli Edilebilirlik) Ağrı Ölçeği" ve "Görsel Analog Skalası (VAS)" kullanıldı. Araştırma verilerinin değerlendirilmesinde geçerlik ve güvenirlik analizleri yapılmıştır.

Bulgular: Uzman görüşü doğrultusunda ölçeğin tüm maddeleri için ayrı ayrı kapsam geçerlilik oranları hesaplanmış ve genel kapsam geçerlilik indeksi 0.97 olarak bulunmuştur. Konfor Ölçeği Doğrulayıcı Faktör Analizi İndeksi Değerleri $\chi 2/sd=3.21$; GFI=0.90; AGFI= 0.91; CFI=0.90; RMSEA=0.07; SRMR=0.07. Standardize edilmiş katsayılar incelendiğinde ölçek maddelerinin faktör yüklerinin yüksek, standart hata değerlerinin düşük, t değerlerinin anlamlı ($p <0.001$) ve R2 değerlerinin yüksek olduğu belirlenmiştir. PCAS alt gruplarının AVE değerleri ≥.50, CR değerleri ise 0.7'den büyük bulundu. Cronbach's Alpha değeri 0.81 idi.

Sonuç: Pediatrik Konfor Değerlendirme Ölçeği'nin çocukların konforunu değerlendirmede kullanılabilecek Türkçe geçerli ve güvenilir bir araç olduğu sonucuna varılmıştır.

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INTRODUCTION

Ensuring the comfort of an individual is an important fundamental building block of holistic nursing care practice. Comfort is a condition sought from birth, a goal to be achieved and a basic requirement (Çınar Yücel and Ergin, 2020). Although comfort as a term is defined as "the state of ease that facilitates daily life", it is a concept integrated within nursing care services performed to help the patient return to their healthy state. The concept of comfort in nursing care is defined as the outcome of deliberate, patient, and family-oriented quality care provided by nurses (Kolcaba and Dimarco, 2005; Yurt and Kubat Bakır, 2020).

The comfort theory is based on the relaxation of function-one within functions of the nursing discipline, was developed by Katharina Kolcaba in 1990. In her theory, Kolcaba defined comfort as "an expected result of a complex structure related to providing assistance and peace for individual's needs and overcoming problems in a physical, psychospiritual, social, and environmental integrity" (Zengin and Çınar, 2019). Comfort has been accepted as a part of quality care in nursing theory. Comfort is also an important concept used by nurse theorists such as Roy, Orlando, Watson, Paterson and Zderad in their theories (Çınar Yücel, 2011)

The concept of comfort, which is important for all people of all age groups and genders, is more essential for the infant/child patient group because this group completely depends on their parents or caregivers to meet their care needs. In pediatric nursing, increasing patient comfort level by applying nursing interventions is an integral component of professional nursing care. Therefore, comfort is a concept that should be emphasized for pediatric nurses. In pediatric nursing, increasing the well-being of the infant/child age group, reducing traumatizing effects of a disease process, and planning and implementing the interventions with minimal or no discomfort are among the initiatives aimed at providing comfort. When the comfort theory is taken as a guide in nursing care in childhood, the quality of care, satisfaction and quality of life of the child and family will be contributed to the quality of care, satisfaction and quality of life of the child and family by providing optimal level of comfort by collecting data on the needs of children, planning and implementing nursing interventions that will increase the comfort related to the needs.

For this, it is necessary for nurses to provide care for the needs, expectations and comfort of children, and to establish standards and forms that will enable the evaluation of outcomes. In this regard, pediatric nurses should evaluate the existing comfort of the infants/children they are responsible for by using comfort measurement tools suitable for the age group. As a result of these evaluations, they should integrate evidence-based practices into the clinic by using the literature knowledge and share the results in a scientific environment (Çınar Yüksel, Göke Aslan, Ergin and Kuğuoğlu, 2019).

There is a need to determine the level or state of comfort in the implementation and evaluation of the effectiveness of comfort-enhancing practices and strategies. In addition to pain scales, comfort scales are also used to evaluate the effectiveness of these strategies (Kolcaba and Dimarco, 2005; Van Dijk et al., 2000; Van Dijk et al., 2009). In our country, there are studies conducted in the field of comfort (Cinar Yucel, Goke Arslan, Ergin, Kuguoglu, 2019; Coşkuner Potur, Doğan Merih, Külek and Can Gürkan, 2015; Karakaplan and Yıldız, 2010; Kuğuoğlu and Karabacak 2008) and especially the premature infant comfort scale (Küçük Alemdar and Güdücü Tüfekçi, 2015) Sedation diagnostic method - comfort scale (Beytut, Başbakkal and Karapınar, 2016) newborn comfort behavior scale (Kahraman, Başbakkal and Yalaz, 2013) Kangaroo Care Comfort Scale (Zengin and Çınar, 2019) developed in different areas for children. However, there are no studies on pediatric comfort. Comfort studies should be made widespread and evaluated. Measurement tools are needed for this. In this study, the aim is to adapt the "Pediatric Comfort Assessment Scale" published in 2005 by Kolcaba and DiMarco to Turkish, which will serve to fill an important gap in literature, and examine the validity, reliability, and factor structure the psychometric properties of the scale on children in parallel with the original scale study. Research question of the study is the Turkish form of the The Pediatric Comfort Assessment Scale a valid and reliable scale?

METHODS

Research Design

This study was carried out as a descriptive research.

Population and Sample

The study population consisted of children treated and cared for in the pediatrics of the health group in which the study was conducted. The hospitals are different branches of the same institution and are similar in terms of health

services, nursing care and patient profile. In the study, no sample selection was made and 256 children between the ages of 1 month and 18 years, without congenital anomalies and not receiving analgesics, whose parents' consent was obtained, were included in the study. The children were divided into infancy (0-1 year), play period (2-3 years), preschool period (4-5 years), school period (6-11 years) and adolescent period (12-18 years) as specified in the literature (Çavuşoğlu, 2013). For scale validity and reliability studies, it is recommended to increase the sample size to 5-10 times the total number of scale items (Sümer, 2000). In this study, the sample size (N=256) was eight times the number of items in the scale.

Data Collection

The study was conducted between October 2018 and January 2019 with children who were being treated and followed up in pediatric units of a Foundation University Hospital of a private Health Group in Istanbul and whose consent was obtained from their parents. Data were collected by the nurses caring for the children. The nurses evaluated the comfort levels by observing the children.

Data Collection Tools

Pediatric comfort assessment scale is a multidimensional scale that assesses comfort and pain in a behavioral-psychological way. For this reason, parallel scales whose validity and reliability were determined according to pediatric age groups were used as data collection tools in the study. NIPS (Neonatal infant pain scale) was used for newborn babies; FLACC (Face, Legs, Activity, Cry, Consolability) Pain Scale was used for children aged 1 month and 9 years; Visual analogue scale (VAS) was used for children aged 3-18 years. In addition, vital signs (temperature, pulse, respiration) and comfort levels of the children were compared.

Descriptive information form: It consists of a total of 16 questions including descriptive information about the child and the family.

Pediatric Comfort Assessment Scale: PCAS was developed and published by Kolcaba and DiMarco in 2005 to measure the comfort and pain levels of 1 month-18 years age group (Kolcaba and Dimarco, 2005). The multidimensional scale assesses comfort and pain in behavioral-psychological terms. PCAS evaluates 5 parameters: vocalizations, motor signs, performance, facial expressions and miscellaneous. Each item is evaluated over a total score on a 5-point Likert scale from 0 to 4 points (0/Doesn't Exist, 1/No, 2/Mild, 3/Moderate, 4/Severe) ordered from bad to good.

In the assessment of the scale:

1. To obtain the total score, item scores of the items marked "Doesn't Exist/DE" are subtracted from the 30 items.
2. The total possible score is obtained by multiplying the remaining item scores by 4.
3. Reverse coded items are 2, 3, 5, 7, 8, 9, 11, 12, 13, 20, 21, 22, 24, 25, 27.
4. The raw comfort score is obtained by summing the comfort responses given to all questions not marked DE and the responses given to the reverse coded items.
5. The actual comfort score (4^{th} step) is divided by the total possible score (2^{nd} step) and rounded up to two decimal places (If the third decimal place is 5 or greater, the second decimal place is rounded up to the next number).
6. The score is reported as a 2-digit number (without using a percentage or decimal), higher scores indicate higher Comfort.

NIPS (Neonatal Infant Pain Scale): Lawrence et al. (1993) created it, then Akdovan and Çiğdem converted it to Turkish (1999). Cronbach's alpha internal consistency coefficient was found between 0.83-0.86. It is frequently used to assess interventional pain in non-intubated premature and term newborns who are not intubated. NIPS has a total score range of 0 to 7, with values more than 3 indicating the presence of pain (Eroğlu and Arslan, 2018).

FLACC (Face, Legs, Activity, Cry, Consolability) Pain Scale: With the pain assessment scale developed by Merkel et al. in 1997, five behavioral categories are assessed and measured in children between 1 month-9 years of age who cannot express their own pain and cannot communicate in the postoperative period. Face, leg movement, cry, activity status, and degree of consolability are the five elements of the scale. Each item is given a score between 0 and 2. The overall score is a number between 0 and 10. A score of 0 indicates that the child is calm and comfortable, a score between 1-3 indicates that the child is mildly uncomfortable, scores between 4-6 show that the child has moderate pain, scores between 7-10 indicate that the child is significantly uncomfortable or has pain, or both (Sezer,

Işık Esenay and Korkmaz, 2021). Cronbach's alpha value of the FLACC Behavior Scale was found to be 0.88 (Voepel-Lewis, Zanotti, and Dammeyer; 2010). The Turkish language validity of the scale used to evaluate acute and postoperative pain in the hospital was determined by Şenayli et al. (Senayli, Ozkan, Şenaylı and Bicakci, 2006).

Visual Analogue Scale: Hayes and Patterson invented the Visual Analogue Scale (VAS) for the first time in 1921. Standard VAS is a unidimensional ordinal scale with a 100 mm line that is widely accepted. VAS is typically a 10 cm horizontal or vertical line that starts with "No Pain" and ends with "Unbearable Pain." This line can be either a straight line or a series of equal intervals. In this case, "0" denotes no pain, while "1-4" denotes mild pain, "5-6" denotes moderate pain, and "7-10" denotes severe pain (Gücü, Erdolu, Ay, Toktaş, Eriş, Vural and Göncü, 2014). In the measuring of pain severity in teenagers, its validity and reliability have been demonstrated. Concurrent validity of acute, chronic, and postoperative pain in the 3-18 age range was found to be=0.61-0.90; test-retest reliability was found to be=0.41-0.58 (Bakır, 2017).

Language Validity Stage

The scale items have been translated into Turkish by three instructors and one professional faculty member of the Department of Foreign Languages. The final version of the scale item, created by selecting the most appropriate statement from the Turkish translation, was back-translated into English by a Turkish-native linguist who received more information on this subject. The final form of the scale item was submitted to an expert review after the necessary modifications were made by the researcher by selecting the most appropriate statement from the Turkish translation of the scale.

Expert Opinion Stage of the Measurement Tool

Expert opinions were sought while evaluating the content validity of PCAS. The Turkish version of the translated scale was presented to 11 faculty members who were experts in the field for this purpose. The expert group consisted of academics working in the field of Pediatric Nursing. The expert opinion was evaluated using the Content Validity Index (CVI). DAVIS was used to assess content validity. Experts' evaluations for content validity can be made with various techniques; Content Validity Index (CVI), Lawshe and Davis techniques are most commonly used (Esin 2014). In the Davis technique, the items are graded as "appropriate (a)", "the item should be slightly revised (b)", "the item should be seriously revised (c)" and "the item is not appropriate (d)". In the Davis technique, the "content validity index" is obtained by dividing the number of experts who chose the "appropriate" and "should be slightly revised" options of the items by the total number of experts. A content validity index of 0.80 indicates that the index is at an acceptable level (Karakoç and Dönmez 2014, Akduman and Cantürk 2010). Experts rated the goods using this index, which included the following statements: Not suitable (1 point), the item must be brought into the appropriate form (2 points), suitable, but small changes are required (3 points) and highly suitable (4 points) (4 points). The CVI of the items was determined to be 0.97, according to expert review.

Pre-trial stage

Expert recommendations were used to revise the Turkish form, and a pilot study was conducted with 15 children who were not part of the study. No adjustments were made in the measurement tool after the pilot study.

Data Analysis

The research data were evaluated using the licensed SPSS 25 (Statistical Package for Social Science) package program. The results were analyzed using a 95% confidence interval and a significance threshold of $p<0.05$. The t-test was used to examine the scale's discrimination. The data was evaluated using descriptive statistical methods such as number, percentage, mean, and standard deviation. Cronbach's alpha coefficient was calculated to determine the internal consistency of the scale. Item-total correlation values were examined to determine the contribution of the items to the scales. The previously known factor structure of the scale was tested with confirmatory factor analysis on the new sample. The construct validity of the scale was tested using confirmatory factor analysis (CFA) with IBM SPSS AMOS Version software during the data analysis (Kartal, Bardakçı, 2018).

Ethical Considerations

Permission was obtained from the creator of the original measuring instrument for the adaptation and validity and reliability of the Turkish Pediatric Comfort Assessment Scale. To conduct the study, ethical approval (Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee, Decision number: E10840098604.01.0144102 on 10 August 2018) and application permit were obtained from the medical group where

the study will be conducted. Families of children who met the criteria of the study group were given the purpose of the study and their informed consent was obtained.

RESULTS

It was determined that 42.2% of the children participating in the study were in the 1 month to 1-year age range, 61.3% were male, and 73.8% did not go to school. It was found that 66% of the children had middle economic status, 93.8% had a nuclear family, and 97.3% had social security (Table 1).

Table 1. Descriptive information (n=256)

Child's:	Groups	Frequency (n)	Percentage (%)
Age	1 Month-1 year	108	42.2
	2-3 years	34	13.3
	4-5 years	21	8.2
	6-11 years	55	21.5
	12-18 years	38	14.8
Gender	Female	99	38.7
	Male	157	61.3
Educational status	Does not go to school	189	73.8
	Primary	31	12.1
	Secondary	22	8.6
	High school	14	5.5
Mother's age	15-25	33	12.9
	26-35	154	60.2
	36-45	63	24.6
	46-55	6	2.3
Mother's education	Illiterate	4	1.6
	Primary	63	24.6
	Secondary	31	12.1
	High school	107	41.8
	University	51	19.9
Mother's working status	Yes	61	23.8
	No	195	76.2
Father's age	15-25	5	2.0
	26-35	118	46.1
	36-45	116	45.3
	46-55	17	6.6
Father's education	Primary	45	17.6
	Secondary	23	9.0
	High school	106	41.4
	University	82	32.0
Father's working status	Yes	253	98.8
	No	3	1.2
Economic status	High	78	30.5
	Middle	169	66.0
	Low	9	3.5
Family type	Nuclear	240	93.8
	Extended	11	4.3
	Single-parent	5	2.0
Social security	Yes	249	97.3
	No	7	2.7

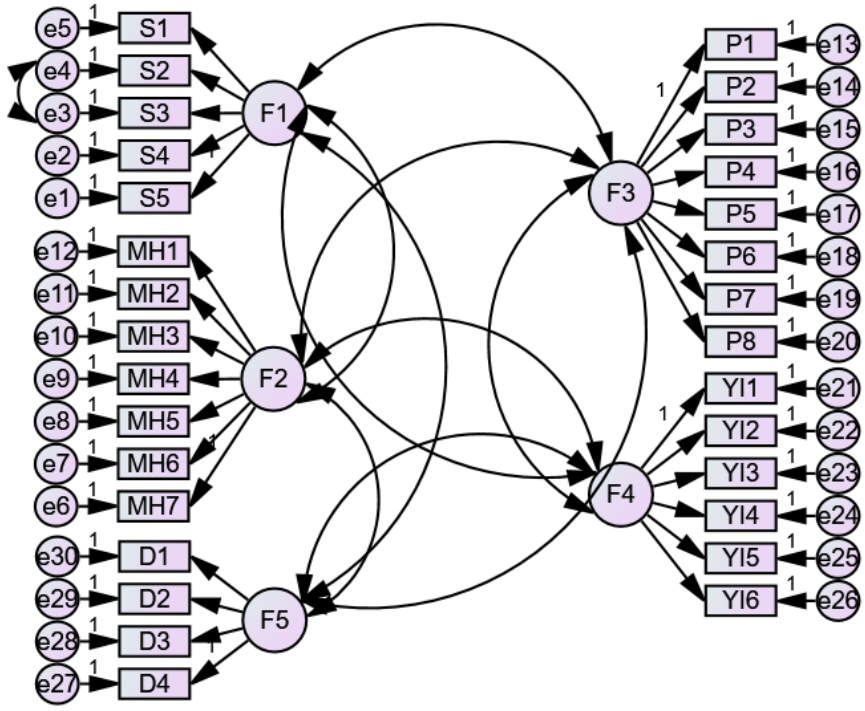
Descriptive statistics

It was established that 41.8% of the children in the sample group were hospitalized with the diagnosis of respiratory system diseases, 12.1% for excretory system diseases, 10.2% for hematological disorders, 7.8% for musculoskeletal system diseases, 7.8% for cancer, 7% for other diseases, 6.6% for cardiovascular diseases, 4.3% for gastrointestinal disorders, and 2.3% for nervous system diseases.

It was determined that 72.3% of the children had a body temperature of 36-36.9 ºC, 21.9% had 37-37. 9 ºC, 5.1% had 38-38. 9 ºC, and 0.8% had above 39 ºC. The heart rate of 68% of the children was found to be 101-150 beats/min, 22.7% was 40-100 beats/min., 9% was 151-200 beats /min., and 0.4% was over 201 beats/min. The respiratory rate of 32% of the children was found to be 26-35 breaths/min, 31.6% was 20-25 breaths/min, 23.4% was 46-60 breaths/min, 11.3% was 36-45 breaths/min, and 1.6% was 60 breaths/min and over. The mean "vocalizations" of the children in the sample group was 70.020±12.259 (Min=35; Max=100), the mean "motor signs" was 66.323±12.992 (Min=14.29; Max=96.43), the mean "performance" was 64.453±13.849 (Min=34. 38; Max=106.25), "facial" mean 63.607±15.655 (Min=25; Max=100), "miscellaneous" mean 65.918±17.658 (Min=31.25; Max=100), "total comfort" mean 65.843±10.508 (Min=37.5; Max=98.33). In addition, the mean of "presence of pain" was 2.990±1.951 (Min=0; Max=8) and the mean of "comfort" was 6.060±1.388 (Min=3; Max=10).

Validity of the Measurement Tool

Factor Structure validity was used to determine the validity of the measurement tool. Confirmatory factor analysis (CFA) is one of the factor analytic techniques used to obtain evidence for the construct validity of the measurement tool. CFA aims to test whether the measurement tool measures a previously known construct (Field, 2009). Confirmatory Factor Analysis (CFA) is a type of structural equation model (SEM) that can measure the relationship between observed variables and latent variables (Brown, 2015). In the study, the goodness-of-fit indices which is commonly used in research was implemented. The predetermined factor structure of the Comfort Scale was tested with confirmatory factor analysis. Comfort Scale consists of 30 items. The first 5 items (e1, e2, e3, e4, e5) were loaded on Factor 1, the next 7 items (e6, e7, e8, e9, e10, e11, e12) on Factor 2, the following 8 items (e13, e14, e15, e16, e17, e18, e19, e20), on Factor 3, other 6 items (e21, e22, e23, e24, e25, e26) on Factor 4, and the last 4 items (e27, e28, e29, e30) on Factor 5 (Figure 1).



F1: Vocalizations; F2: Motor Signs; F3: Performance; F4: Facial; F5: Miscellaneous

Figure 1. Diagram of comfort scale confirmatory factor analysis

Given factor structures on the comfort scale were checked by confirmatory factor analysis. The comfort scale consists of 30 items. The first five items (e1, e2, e3, e4, e5) are loaded into factor 1 and the next seven items (e6, e7, e8, e9, e10, e11, e12) are loaded into factor 2. Next 8 items (e13, e14, e15, e16, e17, e18, e19, e20) into factor 3, another 6 items (e21, e22, e23, e24, e25, e26) into factor 4 and the last the four items (e27, e28, e29, e30) into factor 5 (Fig. 1).

Examining the standardized coefficients, we found that the factor loadings were above 0.4, the standard error values were low, the t-values were significant ($p<0.001$), and the R^2 values were high. These results confirmed the validity of the composition of the given factor structure. The R^2 values of the PCAS confirmatory factor analysis were greater than 0.4. The item correlations of the scale have values between 0.51 and 0.63. The PCAS subgroups had an AVE score of 0.50 and above, but CR values were 0.7 and above (Table 2).

Table 2. Comfort scale factor loadings and regression coefficients for items

Items		Factors	β	Std. β	SE	t	p	R^2	*Item Total Correlation*	*CR*	*AVE*
S5	<---	F1	1.000	0.659				0.536	0.563		
S4	<---	F1	0.499	0.419	0.792	3.136	0.002	0.539	0.423	0.784	0.501
S3	<---	F1	1.458	0.838	0.790	7.203	p<0.001	0.570	0.449		
S2	<---	F1	1.517	0.830	0.395	7.174	p<0.001	0.443	0.542		
S1	<---	F1	0.566	0.404	0.881	5.354	p<0.001	0.488	0.603		
MH7	<---	F2	1.000	0.660				0.613	0.574		
MH6	<---	F2	0.680	0.595	0.082	8.240	p<0.001	0.531	0.542		
MH5	<---	F2	0.603	0.563	0.098	4.587	p<0.001	0.446	0.427	0.712	0.542
MH4	<---	F2	0.654	0.586	0.080	5.935	p<0.001	0.774	0.468		
MH3	<---	F2	0.655	0.587	0.089	4.992	p<0.001	0.832	0.541		
MH2	<---	F2	0.988	0.686	0.106	5.291	p<0.001	0.536	0.502		
MH1	<---	F2	0.599	0.566	0.121	6.204	p<0.001	0.470	0.517		
P1	<---	F3	1.000	0.461				0.547	0.476		
P2	<---	F3	1.179	0.813	0.289	7.540	p<0.001	0.563	0.496		
P3	<---	F3	0.602	0.543	0.172	3.494	p<0.001	0.575	0.438	0.744	0.563
P4	<---	F3	1.967	0.735	0.271	7.256	p<0.001	0.650	0.520		
P5	<---	F3	1.544	0.654	0.297	7.404	p<0.001	0.454	0.509		
P6	<---	F3	0.754	0.504	0.163	4.211	p<0.001	0.415	0.503		
P7	<---	F3	2.438	0.864	0.317	7.699	p<0.001	0.574	0.514		
P8	<---	F3	0.802	0.420	0.150	5.36	p<0.001	0.688	0.428		
YI1	<---	F4	1.000	0.630				0.702	0.507		
YI2	<---	F4	1.090	0.619	0.130	8.372	p<0.001	0.510	0.408	0.788	0.599
YI3	<---	F4	1.661	0.872	0.119	-2.92	0.004	0.544	0.399		
YI4	<---	F4	1.197	0.766	0.121	9.856	p<0.001	0.549	0.412		
YI5	<---	F4	1.669	0.874	0.157	10.636	p<0.001	0.536	0.524		
YI6	<---	F4	0.193	0.096	0.135	5.436	p<0.001	0.4563	0.531		
D4	<---	F5	1.000	0.550				0.487	0.533		
D3	<---	F5	2.431	0.929	0.247	9.843	p<0.001	0.6593	0.395	0.736	0.506
D2	<---	F5	2.001	0.861	0.210	9.507	p<0.001	0.541	0.436		
D1	<---	F5	0.944	0.639	0.123	-2.376	0.018	0.479	0.489		

F1: Vocalizations; **F2:** Motor Signs; **F3:** Performance; **F4:** Facial; **F5:** Miscellaneous; **β:** Beta coefficient; **Std.β:** Standardized beta coefficient; **SE:** Standard error; **t:** t-value; **p:**significance level; **R2:** Coefficient of determination; **Item**: Scale item; **Total correlation:** Total item correlation ; **CR:** Composite reliability; **AVE:** Average variance extracted

The overall reliability of the scale was found to be very high: Cronbach's alpha=0.81. Cronbach's alpha values for sub-dimensions were Vocalizations 0.79, Motor Signs 0.82, Performance 0.80, Facial Expressions 0.84, Miscellaneous 0.80 (Table 3).

Table 3. Mean comfort scores and reliability coefficients (N=256)

Subgroups	Mean	SD	Min.	Max.	Scale Min-Max.	Cronbach's Alpha
Vocalizations	70.020	12.259	35.00	100.00	0-100	0.79
Motor Signs	66.323	12.992	14.29	96.43	0-100	0.82
Performance	64.453	13.849	34.38	106.25	0-100	0.80
Facial Expressions	63.607	15.655	25.00	100.00	0-100	0.84
Miscellaneous	65.918	17.658	31.25	100.00	0-100	0.80
Overall Comfort	65.843	10.508	37.50	98.33	0-100	0.81

The Goodness of fit index commonly used in surveys has been implemented in surveys. Pediatric Comfort Scale Confirmatory Factor Analysis Index Values $\chi 2$/sd 3.214; GFI 0.90; AGFI 0.91; CFI 0.90; RMSEA 0.07; RMR 0.07 (Table 4).

Table 4. Comfort Scale Confirmatory Factor Analysis Index Values

Index	Normal Value*	Acceptable Value **	Comfort scale
$\chi 2$/sd	<2	<5	3,214
GFI	>0.95	>0.90	0.90
AGFI	>0.95	>0.90	0.91
CFI	>0.95	>0.90	0.90
RMSEA	<0.05	<0.08	0.07
SRMR	<0.05	<0.08	0.07

*, ** Sources: (Wang and Wang, 2020; Schumacker and Lomax, 2010; Waltz, Strcikland and Lenz 2010; Hooper, Coughlan and Mullen, 2008).

The difference between the Lower 27 percent and Upper 27 percent groups was used to analyze the scale's discrimination. The t-test was used to see if there was a significant difference in comfort scores between the lower27 and upper27 groups. It was discovered that the difference between the group averages was statistically significant ($p<0.05$). The scale, based on these findings, was found to make precise measurements that could distinguish differences on the new sample.

According to the results of the correlation analysis between comfort scores and pain and vital signs, a significant negative correlation ($p<0.05$) was found between the total score of the PCBS and pain (r -0.726, $p<0.000$), pulse (r -0.214, $p<0.001$) and respiratory (r -0.304, $p<0.000$) scores. No difference was found between the total scores of the PCAS and fever (r -0.025, $p>0.691$).

DISCUSSION

Validity refers to the ability of a measuring instrument to measure the characteristics or condition of the object being measured (Gözüm and Aksayan, 2003). Validity is the degree to which a measurement tool can accurately measure the trait it aims to measure without confusing it with any other trait. The validity of a measurement tool shows how much of the variability in the measurements to be obtained with that measurement tool under standard conditions comes from the actual differences between the degree to which the examined individuals have the measured characteristic (Ercan and Kan, 2004). To assess the validity of the scale, the validity of language and content, and the validity of composition (AVE, CR) were examined (Gözüm and Aksayan, 2003). The basic characteristics required for a standardized scale are scale effectiveness and reliability. Content validity was calculated individually for each item, and each item was positive (greater than 0), so no items were removed from the scale. Given that the Content Validity Index (CVI) is at least 0.80, the fact that the CVI was 0.97 in the survey indicates that the scale items are measured at a good level. As a result of expert opinion, it can be concluded that the Turkish form of Pediatric Comfort Assessment Scale is a suitable measuring instrument in terms of linguistic and content validity.

Confirmatory factor analysis (CFA) is one of the factor analytic techniques used to obtain evidence for the construct validity of the measurement tool. CFA is used to test the relationships between observed variables and the construct or constructs that are accepted to be measured through these observed variables (İlhan and Çetin, 2014). In this technique, it is tested whether a previously defined and restricted structure, a model, is confirmed by the collected

data set (Çokluk, Şekercioğlu and Büyüköztürk, 2010). In adaptation studies, CFA is preferred since the factor structure is known (Doğan and Aybek, 2021). CFA results obtained in this study show that the measurement tool has a high level of compliance. The CFA results from this study show that the measurement tool has a high level of compliance.

Chi-square value is historically the first and most widely used "Goodness-of-Fit" measure for assessing overall model fit (Albright and Park 2009). Chi-square statistics is a technique that tests the hypothesis that the model is compatible with the covariance structures of the observed variables. Since chi-square statistics is an additive statistic and will increase along with the number of variables, degrees of freedom are used. This value ($\chi 2$/sd) is interpreted as "good" when it is in the range of "2 - 3" and as "acceptable" when it is in the range of "4 - 5" (Kayacan and Gültekin, 2012). Based on the Chi-square/degrees of freedom operation results being less than 5, it can be said that the models established in the study are suitable for the observed structure (χ^2/sd=3.214). For a good fit, GFI (Goodness of Fit Index) and AGFI (Adjusted Goodness of Fit Index) values should be above 0.90 or close to 1 (Raykov and Marcoulides, 2006). In the comfort scale, the GFI value was 0.90 and the AGFI value was 0.91. CFI (Comparative Fit Index) is one of the most accepted and used statistics that gives good results even in small samples. The CFI, which is least affected by the sample size, takes a value between 0 and 1. The suitability of the model increases as the value approaches 1 (Yaşlıoğlu, 2017). The CFI value of the comfort scale was determined as 0.90. For RMSEA (Root Mean Square Error of Approximation), which is known as a poor fit index and where a value of 0 indicates excellent fit, values below 0.05 are considered good fit, and values below 0.08 are considered reasonable. SRMR (Standardized Root Mean Square Residual) takes a value between 0 and 1. SRMR indicates good fit as it approaches 0, while high values indicate poor fit (Schumacker and Lomax, 2010; Waltz, Strcikland and Lenz, 2010; Wang and Wang, 2020). As the RMSEA and SRMR values in the comfort scale, 0.07 is a reasonable value. The analysis results and the fit statistics calculated by confirmatory factor analysis were found to be acceptablely compatible with the previously determined factor structure of the scale.

Examination of the standardized coefficients revealed that the factor loads were high, the standard errors were low, and the t-values were significant ($p<0.001$). The item reliability factor (R2) was above the allowable limit of 0.40, and the PCASR2 value was above 0.4 for each item (Schumacker and Lomax, 2010; Wang and Wang, 2020). Item-total correlation explains the relationship between the scores obtained from the test items and the total score of the test. A positive and high item-total correlation indicates that the items exemplify similar characteristics. In general, items with a total item correlation below 0.20 should not be included in the test (Büyüköztürk, 2016). The item correlations of the scale have values between 0.39 and 0.60. As such, it is appropriate to use the items in the scale. Convergent validity indicates that the statements of a variable are interrelated and related to the factors that make them up. Due to the validity of convergence, all scale-related CR values are expected to be greater than the AVE value and the AVE value is expected to be greater than 0.50 (Yaşlıoğlu, 2017). In our study, AVE values of 0.50 and above were determined for each subgroup. A composite confidence score (CR) above 0.7 is another indicator of convergence validity (Hair, Black, Babin and Anderson, 2010). The study found that all subgroups had CR values greater than 0.7 and higher than AVE values.

Reliability is "the ability of measurement tools to provide highly sensitive, consistent and stable measurement results" (Esin, 2015; Gözüm and Aksayan, 2003). In this study, we examined internal consistency and invariance to assess the reliability of the instrument. Cronbach's alpha coefficient is a measure of the internal integrity and uniformity of items in the scale. The higher the alpha coefficient of the scale, the more consistent the items on the scale, indicating that they consist of items that evaluate elements of the same characteristic (Gözüm and Aksayan, 2003). If Cronbach's alpha coefficient is 0.70 or higher, the instrument is said to be usable for research (Özdemir, 2018). Cronbach's Alpha value of PCAS was found to be 0.81, and the internal consistency of the scale was determined to be reliable.

In parallel with the original study (Kolcaba, and Dimarco, 2005), a negative and significant correlation ($p<0.05$) was found between the scores of the PCAS and pain, as well as between pulse and respiration scores. Pain is one of the biggest factors in decreasing physical comfort (Wilson and Kolcaba, 2004). In other studies, it is emphasized that comfort is an indicator of pain and stress and the comfort scale is used in pain assessments (Kahraman, Başbakkal, and Yalaz, 2014; Van Dijk et al., 2009). Painful interventions negatively affect children's physiological parameters, comfort, sleep, growth, and length of hospitalization (Küçük Alemdar, Güdücü Tüfekçi, 2015). Therefore, the nurse should evaluate whether the baby has pain or not and provide comfort by taking the necessary precautions.

CONCLUSIONS

As a result of this research, it was found that the "Pediatric Comfort Assessment Scale", which Turkish language, is an valid and reliable tool that can be used in childcare practices in our country. The scale consists of 30

items in total. PCAS is a multidimensional scale used to assess behavioral and psychological comfort and pain. The PCAS evaluates 5 parameters: sounds, motor movements, performance, facial expressions and other. Each item is evaluated on a 5-point Likert scale ranging from 0 to 4, from bad to good. Higher scores indicate higher Comfort. It is recommended that this scale be used to determine the comfort needs of children receiving care in pediatric units and to assess their comfort levels.

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REFERENCES

Akduman, G.G, Cantürk, G. (2010). The way of behaving scale against the children who were sexual abuse: Acceptability and reliability study (University student sampling). *Turkish Journal of Forensic Medicine, 24*(2), 22-29.

Albright, J.J. Park, H.M. (2009). Confirmatory Factor Analysis using Amos, LISREL, Mplus, SAS/ STAT CALIS; Working Paper; The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing, Indiana University, Indiana University Publishing: Bloomington, IN, USA, Available online: www.indiana.edu/~statmath (accessed on 15 October 2022).

Bakır, E. (2017). Çocuklarda ağrı değerlendirme ve ölçekleri: Kültür ve yaşın ağrı değerlendirmesine etkileri. Pediatric pain assessment and tools: the influence of culture and age on pain assessment. *Türkiye Klinikleri, J Nurs Sci., 9*(4), 299-314. doi: 10.5336/nurses.2016-52467.

Beytut, D., Başbakkal, Z., Karapınar, B. (2016). Validity and reliability study of sedation diagnosis method comfort scale. *AĞRI, 28(*2), 59-119. DOI:10.5505/agri.2015.24471

Brown, TA. (2015). *Confirmatory factor analysis for applied research.* New York, USA: The Guilford Press.

Büyüköztürk, Ş. (2016). *Bilimsel araştirma yöntemleri.* Ankara: Pegem Akademi. ISBN NO: 9789944919289

Coskuner Potur D., Doğan Merih, Y., Külek, H., Can Gürkan, Ö. (2015). Doğum konforu ölçeğinin Türkçe geçerlik ve güvenirlik çalışması. Turkish validity and reliability of the comfort of childbirth scale study. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi, 18*(4), 252-258. https://doi.org/10.17049/ahsbd.44758

Çavuşoğlu, H. (2013). *Çocuklu döneminde büyüme ve gelişme*. Çocuk Sağlığı Hemşireliği (Cilt 1) Ankara: Sistem Ofset Basımevi.

Çınar Yücel, Ş. (2011). Kolcaba'nın konfor kuramı. Kolcaba's comfort theory. *Ege Üniversitesi Hemşirelik Yüksek Okulu Dergisi, 27* (2), 79-88. https://dergipark.org.tr/en/download/article-file/825497

Çınar Yücel, Ş., Ergin, E. (2020). Yaşlılıkta konfor. Comfort in old age. *Sürekli Tıp Eğitimi Dergisi, 29*(1), 69-75. https://doi.org/10.17942/sted.483793

Çınar Yüksel, Ş., Göke Aslan, G., Ergin, E. Kuğuoğlu, S. (2019). Psychometric characteristics of the Turkish version of the nurse comfort questionnaire. *Journal of Religion and Health,* 1-14. https://doi.org/10.1007/s10943-019-00852-4

Çokluk, Ö., Şekercioğlu, G., Büyüköztürk, Ş. (2010). *Sosyal bilimler için çok değişkenli istatistik*. (s. 275). Ankara:Pegem Akademi Yayınları.

Doğan, C.D., Aybek, E.C. (2021). *R-Shıny ile psikometri ve istatistik uygulamaları*. Ankara: PEGEM Akademi, Vadi Grup Basım AŞ. DOI 10.14527/9786258044409

Ercan, İ., Kan, İ. (2004). Ölçeklerde güvenirlik ve geçerlik. Reliability and validity in scales. *Uludağ Üniversitesi Tıp Fakültesi Dergisi, 30* (3), 211-216 . Available at: https://dergipark.org.tr/tr/pub/uutfd/issue/35255/391149 Available from: 22. 01.2023.

Eroğlu, A., Arslan, S. (2018). Yenidoğanda ağrının algılanması, değerlendirilmesi ve yönetimi. Perception,nevaluation and management of pain in the newborn. *D Sağlık Bil. Enst Derg., 8*(1), 52-60. ISSN: 2146-443X

Esin, M.N. (2014). Veri toplama yöntem ve araçlari & veri toplama araçlarinin güvenirlik ve geçerliği. In S. Erdoğan, N. Nahcivan ve M.N. Esin (Eds.), *Hemşirelikte araştirma süreç, uygulama ve kritik*. (pp. 193- 233). İstanbul:Nobel Tıp Kitabevleri.

Esin, M.N. (2015). Veri toplama yöntem ve araçları ve veri toplama araçlarının güvenirlik ve geçerliği. In S. Erdoğan, N. Nahçıvan ve M.N. Esin (Eds). *Hemşirelikte araştirma: Süreç, uygulama ve kritik.* (pp. 193- 233). İstanbul:Nobel Tıp Kitabevleri.

Field, A. (2009). *Discovering statistics using SPSS* (3rd Edition). Los Angeles: Springer.

Gözüm, S., Aksayan, S. (2003). Kültürlerarası ölçek uyarlaması için rehberlik: Psikometrik özellikler ve kültürlerarası karşılaştırma. A guide for transcultural adaptation of the scale II: scale adaptation: Psychometric characteristics and cross-cultural comparison. *Hemşirelikte Araştırma Geliştirme Dergisi, 1,* 3-14.

Gücü, A., Erdolu, B., Ay, D., Toktaş, F., Eriş, C., Vural, A.H., Göncü, M.T. (2014). Endovenöz lazer ablasyon ile semptomatik varislerin tedavisi sonrası hasta memnuniyetinin vizüel analog skala ile değerlendirilmesi: olgu serisi. The evaluation of patient satisfaction with visual analog scale after treatment of varicosities with endovenous laser ablation: case series. *Damar Cer. Derg., 23*(1). Doi: 10.9739/uvcd.2013-38402

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010). *Multivariate data analysis:* Global Edition (7th ed.). Upper Saddle River, NJ: Pearson.

Hooper, D., Coughlan, J., Mullen, M.R.(2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53-60.

İlhan, M., Çetin, B. (2014). LISREL ve AMOS programlari kullanilarak gerçekleştirilen yapisal eşitlik modeli (YEM) analizlerine ilişkin sonuçlarin karşilaştirilmasi. comparing the analysis results of the structural equation models (sem) conducted using LISREL and AMOS. *Journal of Measurement and Evaluation in Education and Psychology, 5*(2), 26-42

Kahraman, A., Başbakkal, Z., Yalaz, M. (2014).Yenidoğan Konfor Davranış Ölçeği'ninTürkçe geçerlik ve güvenirliği. Turkish validity and reliability of comfortneo scale. *Uluslararası Hakemli Hemşirelik Araştırmaları Dergisi, 1*(2), 1-11.

Karakaplan, S. & Yıldız, H. (2010). Doğum Sonu Konfor Ölçeği geliştirme çalışması. Postpartum Comfort Scale development study. *Maltepe Üniversitesi Hemşirelik Bilim ve Sanatı Dergisi, 3*(1),55-65.

Karakoç FY, Dönmez L. (2014). Ölçek geliştirme çalişmalarinda temel ilkeler. Basic Principles Of Scale Development. *Tıp Eğitimi Dünyası, 40,* 39-49.

Kartal, M., Bardakçı, S. (2018). *SPSS ve AMOS uygulamalı örneklerle güvenirlik ve geçerlik analizleri.* Ankara: Akademisyen Kitabevi,Vadi Matbaacilik. DOI.10.37609/akya.1623

Kayacan, B., Y. S. Gültekin (2012, Ekim). Yapısal Eşitlik Modellemesinin (YEM) ormancilikta sosyoekonomik sorunlarin çözümlenmesinde kullanimi. Use of Structural Equation Modeling in Solving Socioeconomic Problems in Forestry. Paper presented at the III. Ormancılıkta Sosyo-Ekonomik Sorunlar Kongresi, İstanbul Üniversitesi, Orman Fakültesi, Istanbul University, Faculty of Forestry, İstanbul.

Kolcaba, K. (1991). A taxonomic structure for the concept comfort. *Image: Journal of Nursing Scholarship, 23*(1), 237-238.

Kolcaba, K., Dimarco, M. (2005). Comfort theory and ıts application to pediatric nursing. *Pediatric Nursing, 31*(3), 187-194.

Kuğuoğlu, S., Karabacak, Ü. (2008). Genel Konfor Ölçeğinin Türkçe'ye uyarlanması. Turkish Version of the General Comfort Questionaire. *Florence Nightingale Hemşirelik Dergisi. 16*(61), 16-23.

Küçük Alemdar, D., Güdücü Tüfekci, F. (2015). The Reliability and Validity of the Premature Infant Comfort Scale's Turkish,(Prematüre Bebek Konfor Ölçeği'nin Türkçe Geçerlilik ve Güvenilirliği). *Hemşirelikte Eğitim Ve Araştırma Dergisi. 12* (2): 142-148

Özdemir, Z. (2018). Development of a likert type attitude scale in health sciences. (Sağlık bilimlerinde likert tipitutum ölçeği geliştirme). *Journal of Hacettepe University Faculty of Nursing-HUHEMFAD-JOHUFON, 5*(1), 60-68.

Raykov, T., Marcoulides, GA. (2006). *Fundamentals of structural equation modeling. a first course in structural equation modeling.* 2nd ed. (p.1-3, 41-3), London: Lawrence Erlbaum Associates.

Senayli, Y., Ozkan, F., Şenaylı, A., Bicakci, U. (2006). Evaluation of postoperative pain in children with FLACC pain scale in Turkish translation. *Turkiye Klinikleri J Anest Reanim, 4*(1), 1-4

Sezer, TA., Işık Esenay, F., Korkmaz, G. (2021). Postoperative pain scale in preschool children: Validity and reliability of Turkish. (Okul öncesi çocuklarda ameliyat sonrası ağrı ölçeği: türkçe geçerlilik ve güvenirliliği). *The Journal of Current Pediatrics, 19,* 84-91. DOI:10.4274/jcp.2021.0012.

Sümer, N. (2000). Yapısal eşitlik modelleri. Structural equation models. *Türk Psikoloji Yazıları, 3*(6),49-74. https://psycnet.apa.org/record/2006- 04302-005

Schumacker, R., Lomax, RGA. (2010). *Beginner's guide to structural equation modeling* (p.1-8). New Jersey: Taylor & Francis.

Van Dijk, M., Roofthooft, D.W., Anand, K.J., Guldemond, F., De Graaf, J., Simons, S., … Tıbboel, D., (2009). "Taking up the challenge of measuring prolonged pain in (premature) neonates The COMFORTneo Scale seems promising". *Clin J Pain, 25,* 607-616.

Voepel-Lewis, T., Zanotti, J., Dammeyer, J.A. (2010). Sandra Merkel Reliability and validity of the face, legs, activity, cry, consolability behavioral tool in assessing acute pain in critically ill patients. *Am J Crit Care*. 19(1), 55-61; quiz 62. doi: 10.4037/ajcc2010624.

Waltz, C.F., Strcikland, O.L, Lenz, E.R. (2010). *Measurement in nursing and health research* (p.176-8). New York: Springer Publishing Company.

Wang, J., Wang, X. (2020). *Structural equation modeling: Applications using mplus.Second Edition* (p.5-9). John Wiley & Sons.

Wilson, L., Kolcaba, K. (2004). Practical application of comfort theory in the perianesthesia setting. *J Perianesth Nurs. 19*(3),164-173; quiz 171-3. doi: 10.1016/j.jopan.2004.03.006.

Yaşlıoğlu, M.M. (2017). Sosyal bilimlerde faktör analizi ve geçerlilik: keşfedici ve doğrulayıcı faktör analizlerinin kullanılması. Factor analysis and validity in social sciences: exploratory and confirmatory factor analysis using it. *Istanbul University Journal of the School of Business, 46,* 74-85. ISSN: 1303-1732

Yurt, S., Kubat Bakır, G. (2020). Cerrahi operasyon geçiren hastaların konfor düzeyinin değerlendirilmesi.Evaluation of the Comfort Level of the Post-Surgical Patients. *Sağlık ve Toplum, 3.*

Zengin, H., Çınar, N. (2019). Development of The Kangaroo Care Comfort Scale and assessment of its validity and reliability. (Kanguru bakımı konfor ölçeği'nin geliştirilmesi, geçerlik ve güvenirlik çalışması). *Hemşirelikte Araştırma Geliştirme Dergisi, 21*(1-2), 69-83.