

Psychometric properties of the Turkish version of the Stress Scale for Nurses Providing End-of-Life Care for Children

Original Article



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Abstract

Objectives. This study was carried out to evaluate the validity and reliability of the Stress Scale for Pediatric Nurses Performing End-of-Life Care for Children in Turkey.

Methods. This was a methodological study conducted with 222 pediatric nurses. Data were collected using the information form for pediatric nurses and the “stress scale for nurses performing end-of-life care for children.” Content and construct validity, item analysis, confirmatory factor analysis and internal consistency were used to evaluate the data. The Global Pharmaceutical Regulatory Affairs Summit checklist was followed in this study.

Results. The content validity index of the scale was 0.93. Item-total score correlation values ranged from 0.594 to 0.885. The 5-factor structure of the scale was confirmed as a result of confirmatory factor analysis. Factor loads were greater than 0.30, and fit indices were greater than 0.80. The Cronbach’s alpha coefficient of the Turkish version of the scale was 0.97.

Significance of results. The stress scale for nurses performing end-of-life care for children is a valid and reliable measurement tool for the Turkish sample. This scale facilitates the assessment of the stress levels of pediatric nurses who provide end-of-life care to children. Also, this scale can be used in interventional studies to improve the well-being of pediatric nurses.

Introduction

Today, terminal illness or death not only overshadows adults or the elderly but can also happen to children (Adistie et al. 2019). The Lancet Commission emphasizes that 2.5 million children die every year in the world due to serious health problems, and the majority of deaths occur in low- and middle-income countries (Knaul et al. 2018). According to these estimates, every year 21 million children under 19 years, including newborns and infants, require end-of-life care due to cancer, cardiovascular diseases, liver cirrhosis, congenital anomalies, neurological disorders, and neonatal conditions (Adistie et al. 2019; Connor et al. 2017). A child’s end-of-life circumstances and care are extremely important, and health professionals have a responsibility to provide high-quality care, including dignity, respect, and symptom control, during this time (Mayland et al. 2022).

A specific part of palliative care, end-of-life care, is a special type of care that recognizes death as the last stage of life, designed to focus on quality of life rather than length (Ranallo 2017). End-of-life care includes the management of physical symptoms, the provision of psychological, social, and spiritual support, and the fulfilment of wishes of the patient and their families (Alshammari et al. 2022). End-of-life care, which focuses on the last days and last hours of life, is for people who are about to die; needs, when to die, what to expect, preference for control and desires, being informed, quality of life, physical, emotional and cognitive symptoms, pre-planning of care, functional status, spirituality, grief, quality and satisfaction of care (Chan et al. 2016). If the end-of-life care needs of patients are not met, poor quality of life, including traumatic death, decreased sense of spiritual well-being, and increased risk of depression, may result (Muscat et al. 2016; O’Brien et al. 2019).

End-of-life care with pediatric patients is considered to be particularly difficult because typically the death of children is considered “against the natural order.” Therefore, providing end-of-life care for pediatric patients has significant emotional effects on health professionals and brings with it a number of challenges (Muscat et al. 2016). End-of-life care is provided by a professional team of doctors, nurses, social workers, and other specialists, who play an important role and spend more time than other healthcare professionals (Fernando and Hughes 2019; Geum et al. 2019; Tamaki et al. 2019). Caring for a dying child is often described as a painful and stressful experience for a pediatric nurse (Chew et al. 2021). Nurses experience personal grief when a child dies, and the experience of grief can be long-lasting, painful, and stressful. Stress may intensify if the nurse’s roles and responsibilities are not clear or there is a feeling that optimal

end-of-life care is not provided (Bloomer et al. 2015). Also, in some cases, the death of a patient results in inadequate nursing actions and therapeutic efforts to save the patient's life, leading to feelings of professional failure and impotence. It is a fact that nurses are affected by the intense emotional state they experience and the anxiety, stress, and workload created by the environment they work in because they witness the death of the individuals they care for (Jang et al. 2019; Nia et al. 2016). For this reason, it is important to investigate the thoughts and fears of end-of-life care nurses about death and to determine their stress and anxiety levels (Nia et al. 2016) because this situation may affect the empathic concerns of nurses, the quality of care they provide, and the way they cope with work-related stressors (Peters et al. 2013). In addition, caring for dying patients leads to grief and perceptions of failure, which may raise increased anxiety about managing the death process in the work environment (Peterson et al. 2010).

End-of-life care is given with a multidisciplinary team approach such as doctors, nurses, physiotherapists, and play therapists who are experts in their fields, centered on the individual and the family, and the nurse is the team member who is in constant communication and meets the care needs the most. In order for the nurse to provide adequate, effective, and holistic care, it is necessary to acquire sufficient knowledge and technical skills before graduation (Ferrell et al. 2010; Kudubeş et al. 2022). Studies for the inclusion of "end-of-life care, good death concepts" in the nursing curriculum in Turkey started in 1990, and they started to enter undergraduate programs in the last 10 years, and the deficiencies are tried to be eliminated with the training and certificate programs provided by the Ministry of Health (Aksakal 2018). In a systematic review, it was found that the "quality and reflection of practice" of the training that newly graduated nurses received before graduation on palliative care or end-of-life care was insufficient and that nurses were nervous, helpless, powerless, stressed, uncertain about palliative care or care for individuals in the end-of-life period. It was found that they gave different emotional reactions such as anger (Zheng et al. 2016). Therefore, this situation shows that there is a need for objective, valid, and reliable standardized measurement tools in order to carry out qualified studies on the subject with pediatric nurses. It is known that there are a limited number of studies and valid and reliable data collection tools in the foreign literature (Park 2018; Park and Ju 2020; Sansó et al. 2021), while there is no measurement tool in Turkey as far as we know. Therefore, this study was conducted to evaluate the Turkish psychometric properties of the "Stress in Korean Nurses Performing End-of-Life Care for Children Scale."

Methods

Design and participants

A methodological design was used in the study. The data for this study were collected between May 2021 and January 2022 in the form of an online survey as a result of the COVID-19 pandemic. The application of the survey was made available to the pediatric nurses with the link created via Google Form.

Among the suggested methods for sample calculation in scale development studies, the rules of 5s, 10s, and 100s were applied (Şencan 2005). A researcher should recruit at least 5 persons per item to perform factor analysis. If there is no problem in reaching the number of sample, the number of people per item should be 10 (Brown 2015; Finch 2019). The Stress Scale for Nurses Performing End-of-Life Care to children includes 22 items, and the number of

nurses per item was calculated as 10, and the study was planned to include 220 nurses.

Pediatric nurses who work in the pediatric ward or intensive care unit of university or state hospitals in 4 big cities in the east and west of Turkey and who have experience in caring for children with terminal illnesses were invited to participate in the study. Information about the purpose and scope of the study was given through WhatsApp and Facebook groups where pediatric nurses are subscribed, and the nurses were invited to the study. "Nurse information form" and "Stress in Korean Nurses Performing End-of-Life Care for Children" scale were sent online and filled by 222 pediatric nurses who volunteered to participate in the study. The time to answer the survey was approximately 10–12 minutes for each participant.

Data collection tools

Study data were collected using the Information Form for Nurses and the Stress in Korean Nurses Performing End-of-Life Care for Children Scale.

Nurse information form

The information form prepared by the researchers in line with the literature consisted of questions such as the nurse's age, gender, education, working time, the unit he/she worked in, and receiving training on pediatric terminal care.

Stress in Korean Nurses Performing End-of-Life Care for Children

It is a scale developed by Park and Ju (2020), which measures the stress level of nurses who care for children with terminal disease. The scale consists of a total of 22 items and 5 sub-dimensions: "Psychological Difficulties," "Conflict with Parents," "Communication Difficulties," "Lack of Information on End-of-Life Care," and "Restricted Working Environment." The tool, which includes 5-point Likert-type response options, is rated on a 5-point scale ranging from strongly disagree (1 point), disagree (2 points), not sure (3 points), agree (4 points), and strongly agree (5 points). A high score from the scale indicates a high level of stress. The Cronbach's alpha reliability coefficient of the scale was determined as 0.90 (Park and Ju 2020).

Steps of research

Language validity stage

The English text created by the author of the scale was used in the language validity study of the "Stress in Nurses Performing End-of-Life Care for Children" scale. The language validity process includes the translation stages of the scale first from English to Turkish and then from Turkish to English. In the first stage, 3 different linguists, who knew both English and Turkish languages professionally, independently translated the scale into Turkish. After the scale was translated into Turkish, it was corrected by the researchers' group work. The Turkish language of the scale was approved by a Turkish language expert. The Turkish scale was translated back to English by a linguist who speaks both languages at a native level and whose mother tongue is English. The Turkish and English scales were compared by the other linguist; no change in meaning was observed in the scale items, and the language validity of the scale was completed.

Content validity stage

After the language adaptation of the scale, the content validity was then conducted with the expert opinion method to evaluate its validity. Content validity index (CVI) is the most widely used index in quantitative evaluation. Content validity consists of obtaining expert opinions in order to determine whether the items in the measurement tool are suitable for the purpose of the measurement and whether or not they represent the field to be measured (Erci and Aslan 2022; Şencan 2005). For this purpose, 11 specialists (a palliative care specialist, a pediatric hematology–oncology specialist, 2 pediatric oncology nurses, 2 pediatric intensive care nurses, a neonatal nurse, and 4 pediatric nursing lecturers working in this field) were consulted to evaluate the scope validity of the scale, which was translated into Turkish. It is recommended to obtain at least 3 expert opinions to evaluate the content validity of the scales (Morgado et al. 2017). The scale was sent to them via e-mail. They were informed about the measurements and concepts involved. Content validity was calculated using the Davis technique (Davis 1992). The experts were asked to evaluate whether or not each scale item measured the “Stress in Nurses Performing End-of-Life Care for Children” scale and the understandability of the scale items on a scale rated between 1 and 4. On this scale, as “appropriate” is 4 point, “the item should be slightly revised” is 3 point, “the item should be seriously reviewed” is 2 point, and “the item not appropriate” is 1 points. The number of experts who chose options (3) and (4) was divided by the total number of experts to obtain the “content validity ratio” of the item (Almanasreh et al. 2019).

Pretrial stage

It is recommended to apply the scale to a group of approximately 20–30 people after specialists’ opinions are taken (Şencan 2005). The scale was applied to 20 nurses who perform end-of-life care to children with similar characteristics to the sample and agreed to participate in the study, but these nurses were not included in the sample (Şencan 2005). Nurses did not give negative feedback regarding intelligibility, readability, and response process. The intelligibility of the scale was found to be sufficient in the pilot application, and then it was applied to the full sample.

Data collection process

Due to the COVID-19 pandemic, study data were collected online. Data were obtained by sharing the online link of the survey, which was created using Google Forms, via social media (Facebook, etc.) and WhatsApp groups of the nurses.

Data analysis

Data were analyzed using SPSS Statistics (v.25.0; SPSS, Chicago, IL) and AMOS 21 software packages. Descriptive statistics on sociodemographic information collected from nurses were presented as frequency, percentage, and mean values.

In this study, content validity and construct validity were used to ensure the validity of the Turkish form of the scale. The CVI was used to assess agreement among specialists (Polit et al. 2007). Construct validity, item analysis, Kaiser–Meyer–Olkin–Bartlett tests, confirmatory factor analyses, Cronbach’s alpha reliability coefficient, split-half analysis (Spearman–Brown and Guttman), and split-half values were calculated.

Ethical considerations

In order to conduct the study, permission was obtained from the scale owner (Park and Ju 2020) via e-mail. Also, approval was obtained from the scale owner to remove the word “Korean” in

the original scale title. Ethics committee approval was obtained from the human research ethics committee of a university (Date: 30/04/2021 Protocol No: 05/37), and necessary permissions were obtained from the Ministry of Health. The consent form, which included informing regarding the purpose of the study, was sent to the nurses online, and their consent was obtained and recorded.

Results

Demographic characteristics of participants

A total of 222 pediatric nurses participated in the study. 86.0% of the nurses were female, 57.7% single, 33.8% had children, 63.5% were university graduates, and the mean age was 28.7 (± 5.77) years (Table 1). In the study, 53.1% of the nurses had clinical experience for 1 to 5 years, 37.4% were working in the Pediatric Intensive Care Unit, and 89.2% were service nurses. The average number of pediatric patient deaths faced by the participants was 6.3 (± 8.19) per year, and 20.3% of the participants stated that they received training on end-of-life care. Stress Scale for Nurses Providing End-of-Life Care for Children mean scores were compared according to the descriptive characteristics of the nurses participating in the study. It was found that the mean score of the scale was significantly higher for women than for men. According to the results of the analysis, it was determined that there was a statistically significant difference between the mean scores of the Stress Scale for Nurses Providing End-of-Life Care for Children according to the education level of the nurses ($p < 0.05$). Tamhane’s test was applied from post hoc pairwise comparisons to find the group that made a difference. According to the test results, it was found that the mean score from the scale was lower for those with a Medical Vocational High School education than those with a bachelor’s degree and those with a graduate education at Medical Vocational High School (Table 1).

Validity

Content validity

The translated scale, consisting of 22 items, was judged by the expert panel for relevance and phrasing of the items. The experts mostly evaluated the items as quite relevant. The content validity ratios of the items ranged from 0.80 to 1.

Item-total score correlations

As a result of the analysis made with 22 items in the scale, it was determined that the item-total score correlation coefficients ranged between $r = 0.594$ and 0.885.

Construct validity

The construct validity of the scale was evaluated with confirmatory factor analysis (CFA). Before these analyses, Kaiser–Meyer–Olkin (KMO) value and Bartlett test results were examined. In this scale, the KMO test value was 0.95 and Bartlett’s test value was 4360.06 ($p < 0.001$). When the correlations between the variables are examined, it is seen that the factor loads of the items are above 0.40 and all correlation relationships are significant.

Goodness-of-fit statistics of the conceptual model of the scale were tested with CFA. According to the CFA, the structural equation modeling results of the scale were found to be significant at the $p = 0.000$ level, and it was found to be related to the 22 items that make up the scale and the scale structure with 5 factors (Figure 1). The model had been improved. While making the

Table 1. Descriptive characteristics of nurses ($n = 222$)

Variables		<i>n</i>	%	$X \pm SS$	Test <i>p</i>
Gender	Female	191	86.0	80.79 ± 20.65	<i>t</i> : 1.978; <i>p</i> : 0.049
	Male	31	14.0	72.80 ± 22.14	
Marital status	Married	94	42.3	76.74 ± 21.96	<i>t</i> : -1.794; <i>p</i> : 0.074
	Single	128	57.7	81.83 ± 20.07	
Having children	Yes	75	33.8	77.76 ± 21.68	<i>t</i> : -0.973; <i>p</i> : 0.332
	No	147	66.2	80.65 ± 20.64	
Educational status	Medical vocational high school ^a	51	23.0	70.70 ± 23.52	<i>F</i> : 6.346; <i>p</i> : 0.002; a < b, a < c
	Undergraduate ^b	141	63.5	82.27 ± 20.08	
	Postgraduate ^c	30	13.5	82.73 ± 16.55	
Clinical experience	1–5 years	118	53.1	82.20 ± 20.37	<i>F</i> : 2.303; <i>p</i> : 0.078
	6–10 years	65	29.3	75.60 ± 20.96	
	11–15 years	21	9.5	73.85 ± 23.99	
	16 years and above	18	8.1	84.66 ± 19.10	
Position	Head nurse	24	10.8	84.75 ± 19.81	<i>t</i> : 1.254; <i>p</i> : 0.211
	Clinic nurse	198	89.2	79.06 ± 21.10	
Working unit	Pediatric inpatient units	139	62.6	79.64 ± 21.89	<i>t</i> : -0.037; <i>p</i> : 0.971
	Pediatric intensive care unit	83	37.4	79.74 ± 19.53	
Palliative care information	Yes	186	83.8	79.56 ± 21.46	<i>t</i> : -1.177; <i>p</i> : 0.859
	No	36	16.2	80.25 ± 18.63	
Training on terminal or end-of-life care	Yes	45	20.3	76.62 ± 19.56	<i>t</i> : -1.948; <i>p</i> : 0.344
	No	177	79.7	80.45 ± 21.32	
Education on pediatric terminal period or end-of-life care	Yes	43	19.4	76.95 ± 19.46	<i>t</i> : -1.948; <i>p</i> : 0.344
	No	179	80.6	80.33 ± 21.34	
Variables				Min–max	$X \pm SS$
Age				18–49	28.7 ± 5.77
Number of pediatric patient deaths encountered per year				1–50	6.3 ± 8.19
Weekly working hours				4–200	46.0 ± 15.52

^aThose whose education level is a health vocational high school.

^bThose with a bachelor's degree in education.

^cEducational graduate students.

improvement, the variables that reduced the fit were determined, and a new covariance was created for those with high covariance among the residual values. Afterwards, it was shown that the accepted values for the goodness-of-fit index (GFI), comparative fit index (CFI), normed fit index (NFI), and standardized root mean square residual (SRMR) fit indices were provided in the renewed fit index calculations. When the goodness-of-fit indices of the Stress in Nurses Performing End-of-Life Care for Children are examined, it can be said that the GFI 0.813, CFI 0.921, and χ^2/df 3.3013 ($p = 0.000$) values are at an acceptable level (Table 2).

Reliability

The reliability of the measurement model was tested by looking at the average variance explained (AVE) and composite reliability (CR) values for each factor separately. The CR value of the

latent variables in the measurement model should be higher than 0.70 and the AVE value should be higher than 0.50 (Hair et al. 2010, 124). The CR value of the latent variables in the measurement model should be higher than 0.70 and the AVE value should be higher than 0.50 (Hair et al. 2010, 124). As a result, it was determined that the scale had discriminant validity (Table 3).

The Cronbach's alpha coefficient of the Turkish version of the scale is 0.97. It was determined that Factor 1 (Psychological difficulties) α value was 0.95, Factor 2 (Conflict with parents) α value was 0.90, Factor 3 (Difficulties in communication) α value was 0.92, Factor 4 (Lack of terminal care knowledge) α value was 0.83, and Factor 5 (Restricted working environment) α value was 0.91 (Table 3).

The results of the split half analysis of the scale are shown in Table 4. First, the test questions were randomly divided into 2 parts, then both parts were sent simultaneously to a group of

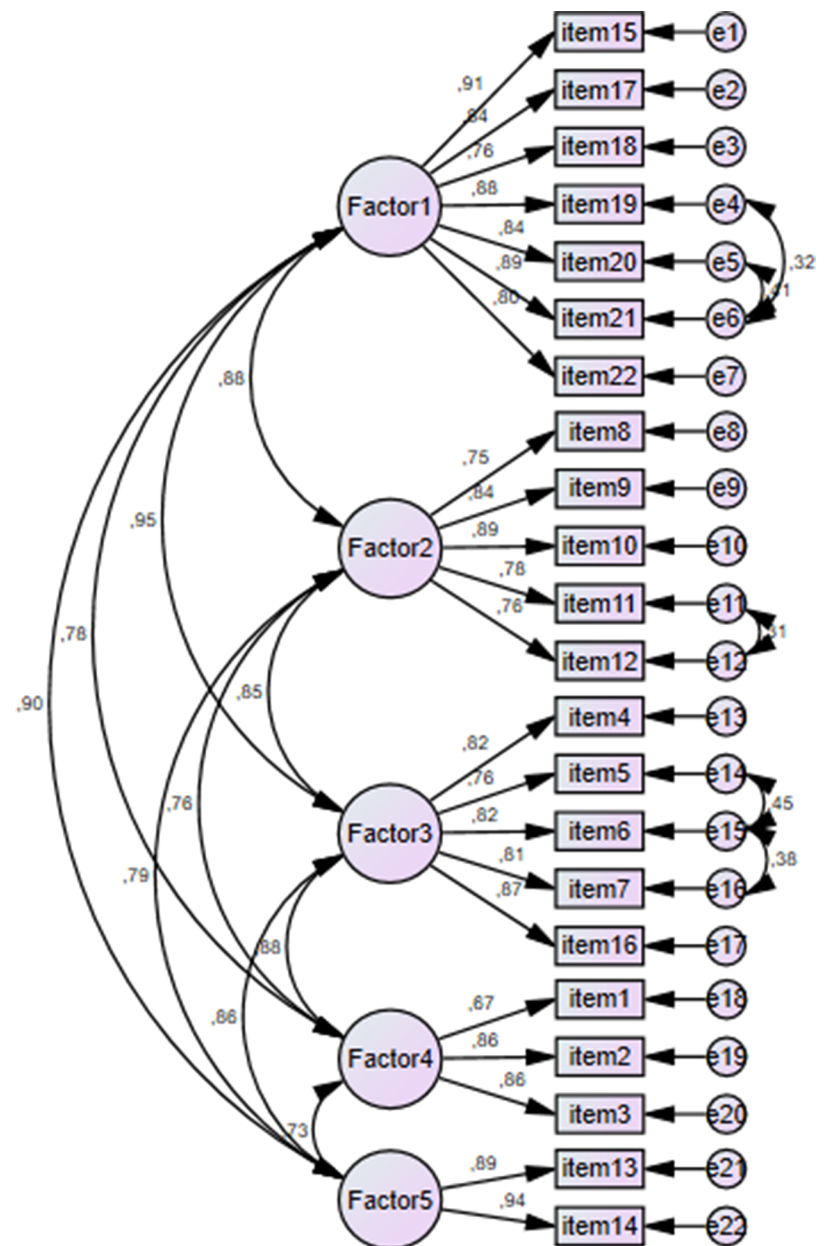


Fig. 1. Confirmatory factor analysis of the Stress Scale for Nurses Performing End-of-Life Care for Children.

participants. Each half of the test was scored for each participant. According to the split half analysis, the Cronbach's alpha coefficients of the first and second half were found to be 0.93 and 0.96, the Spearman–Brown coefficient was 0.93, the Guttman 2-half coefficient was 0.93, and the correlation coefficient between the halves was 0.87 (Table 4).

Discussion

In the study, it was found that nurses' gender and educational status variables were effective variables on the Stress Scale for Nurses Providing End-of-Life Care for Children score averages. Nurses who provide end-of-life care to pediatric patients face intense stress (Pearson 2013). Factors such as caring for a dying child, lack of knowledge, communication problems with parents, and working

environment are common characteristics that cause stress in nurses (Jang 2013). It is emphasized that there is a need for valid and sensitive measurement tools that measure the stress and difficulties experienced by nurses while giving end-of-life care to pediatric patients (Park and Ju 2020). Akay and Aytekin Özdemir (2021), in their study with newborn nurses in Turkey, tested the validity and reliability of the Neonatal Palliative Care Attitude Scale. Although it is important to determine the level of stress experienced by nurses caring for dying children, there is no valid and reliable tool to determine and evaluate the extent of this stress in pediatric nurses in Turkey. Therefore, testing the end-of-life care stress assessment tool in terms of validity and reliability is necessary to evaluate the stress dimension of pediatric nurses in Turkey.

The results of this study showed that the psychometric properties of the Turkish version of the "Stress Scale for Korean

Table 2. Stress scale first level multi-factor model confirmatory factor analysis fit indices for nurses providing end-of-life care for children

	Structural model values	Recommended values
CMIN/DF	3.013	≤5
GFI	0.813	≥0.80
CFI	0.921	≥0.80
TLI	0.906	≥0.80
IFI	0.922	≥0.80
RFI	0.866	≥0.80
NFI	0.888	≥0.80
SRMR	0.046	≤0.10

Reference: Bayram 2011; Browne and Cudeck 1993; Meydan and Şenen 2011; Şimşek 2007. CMIN/DF, Chi-square/df; GFI, goodness-of-fit index; CFI, comparative fit index; IFI, incremental fit index; TLI, Tucker–Lewis Index; RFI, relative fit index; NFI, normed fit index; SRMR, standardized root mean square residual.

Nurses Providing End-of-Life Care for Children” were promising. According to expert opinions, it is seen that the scale is suitable for the purpose of measurement and represents the area to be measured. The CVI of the scale items was between 0.81 and 1.0. In this study, the CVI values above 0.80 indicate (Şencan 2005) that the scale adequately measures the agreement among experts and its subjects. As a result of expert opinions, content validity criteria were met.

Pediatric nurses participating in this study experienced moderate to high levels of end-of-life care stress. In other studies using the same measurement tool as the current study, the levels of end-of-life stress of pediatric nurses working in the hospital were similar (Park and Jeong 2021; Park and Ju 2020). In addition, similar results were reported in a study using an end-of-life care stress tool developed by Jang (2013) for neonatal intensive care unit nurses in a tertiary hospital.

Item analysis was performed to test the relationship between scale items and total, and the lower limit for item–total score correlation values was accepted as 0.30 (Büyüköztürk 2002). In this study, item–total score correlation analyses were performed to evaluate the fit of the items with each other and with the scale. Item correlation values between 0.594 and 0.885 revealed that each item of the scale was related to other items and the scale. The scale is sufficient to measure the stress level of pediatric nurses performing end-of-life care to children.

Bartlett Sphericity test and KMO analysis are important tests that evaluate the suitability and adequacy of data for factor analysis. The Bartlett Sphericity test result should be statistically significant and the KMO value should be 0.60 and above for factor analysis (Boateng et al. 2018). The KMO value of the scale was found to be above 0.90 and Bartlett’s test was found to be significant ($\chi^2 = 4360.063$, $p = 0.000$) (Aroian and Norris 2007). Park and Ju (2020) determined in their study that the sampling adequacy measure of KMO was strong at 0.90 and Bartlett’s test of sphericity was significant ($p < 0.001$).

The rate of variance explained is an important indicator of construct validity. As the variance ratio increases, the factor structure of the scale gets stronger (Boateng et al. 2018; Finch 2019). The fact that the variance explained in multidimensional scales is 50% at minimum is considered sufficient (Tabachnick and Fidell 2007). The fact that the variance explained in this study is over 50% indicates a strong construct validity. In the study of Park and Ju (2020), 5 factors were accepted, representing 61.13% of the variance.

The results of the research were found to be compatible with each other.

In this study, item factor loads of the scale were found to range between 0.67 and 0.94. The factor structure of the data is determined with the help of factor loads. It is recommended that the minimum factor load be 0.30 and above (Finch 2019; Polit and Hungler 1999). In this study, no item was removed from the scale because the factor load of each item was over 0.30. In the original study of the scale, the factor loads of the items in the 5 subdimensions were ≥ 0.40 (Park and Ju 2020). The results of this study were similar to the factor loadings in the original scale and revealed a strong factor structure.

The factor structure of the scale was tested with CFA (Brown 2015; Xia and Yang 2019). In this study, 5 subdimensions were created similar to the original scale. The chi-square value (χ^2/df) divided by the degrees of independence was 3.013. Some of the commonly used indices are GFI, CFI, NFI, and GFI. SRMR < 0.10 , NNFI and CFI ≥ 0.90 , and GFI ≥ 0.80 indicate a good fit (Harrington 2009). CFA showed that CFI, NFI, SRMR, and GFI values were sufficient. Model fit indices greater than 0.80 are accepted as an indicator of acceptable fit in the current literature. It is also emphasized that the χ^2/df value should be less than 5 (Brown 2015; Marsh et al. 2020). The results of the CFA in this study were found to be compatible with the criteria specified in the literature for the fit indices. The results of CFA in the study in which the original scale was developed are similar to the results in this study, showing the scale’s compatibility with the model. The fit indices confirm the 5-factor scale structure and the items adequately describe the factors. CFA analysis results support the scale structure and show that the scale is a valid tool that can be used for Turkish society.

In this study, the Cronbach’s α coefficient of the scale was 0.97, and the Cronbach’s α values of the 5 factors were found to vary between 0.83 and 0.95. Park and Ju (2020) found the Cronbach’s α coefficient of the scale to be 0.90. Cronbach’s α from 5 factors was found to vary between 0.77 and 0.90 (Park and Ju 2020). It is seen that the results of the study are similar. The reliability coefficient (α) of a measurement tool is expected to be close to 1. The reliability coefficient (α) reveals whether the items measure the same feature and whether they are related to the subject. It is recommended that this value be between 0.60 and 1.00 (Nunnally and Bernstein 2010). In this study, the Cronbach’s α value of the scale was 0.97, indicating that the items were consistent with each other and the internal consistency of the scale was high. The items adequately measured the stress of nurses providing end-of-life care to children and had high reliability. Park and Jeong (2021) found the Cronbach’s α of the “End-of-Life Care Stress” scale to be 0.88. In the study of Kim and Kim (2020), the Cronbach’s α of the “Palliative Cancer Care Stress” scale was found to be 0.94. As a result, item reliability analysis of the scale was found at an acceptable level.

In the split-half analysis, one of the analyses showing reliability is expected to have coefficients greater than 0.70 at the level of the scale (Chakrabarty and Nath Chakrabarty 2013; Nunnally and Bernstein 2010). The coefficients in this study were above 0.70, indicating a strong and significant relationship between the 2 halves. Results of 2 studies could not be given, since split-half analysis results were not presented in the original study (Park and Ju 2020).

This study provided evidence for the reliability and validity of the assessment tool to measure the end-of-life care stress of pediatric nurses in Turkey. This tool may contribute to future research to identify the stress that pediatric end-of-life care causes in nurses.

Table 3. Results regarding the measurement model of the scale

Factors	Items	Factor loading	CR	AVE	Corrected item-total correlation	Cronbach's alpha if item deleted	Cronbach's alpha (α)
Factor 1: Psychological difficulties	15. When I have to perform a treatment that causes pain to a dying child	0.914	0.95	0.72	0.594	0.973	0.950
	17. When I get to witness the parents getting fatigued by long-term stay in the hospital	0.843			0.720	0.972	
	18. When the parents consider their child's death as a medical failure	0.756			0.720	0.972	
	19. When it is hard to stay indifferent about the child's death	0.884			0.772	0.971	
	20. When I experience a sense of loss for the death of a child patient as if he/she were my own child	0.839			0.729	0.972	
	21. When the pain of the bereaved parents affects me	0.891			0.801	0.971	
	22. When I have to take care of other terminally ill children before resolving the emotion experienced from the death of a previous child patient	0.803			0.813	0.971	
Factor 2: Conflict with parents	8. When the parents make excessive demands over the treatment process for their child	0.747	0.90	0.65	0.664	0.972	0.903
	9. When the medical team and the parents disagree on the direction of treatment for the child	0.841			0.754	0.971	
	10. When the parents do not seem to trust nurses	0.887			0.792	0.971	
	11. When the parents decide on the treatment process themselves regardless of their child's will	0.783			0.719	0.972	
	12. When the parents ask me to lie to their child	0.762			0.768	0.971	
Factor 3: Difficulties in communication	4. When it is hard to figure out what the child's needs are	0.822	0.91	0.67	0.786	0.971	0.923
	5. When I do not know how to explain to the child in an age-appropriate way that he or she is going to die	0.762			0.827	0.971	
	6. When I feel that there is nothing I can do for the dying child	0.823			0.885	0.970	
	7. When I have to communicate bad news about the child (such as treatment and prognosis) to his or her parents	0.809			0.841	0.970	
	16. When I do not know what to say to the parents after their child's death	0.873			0.801	0.971	
Factor 4: Lack of terminal care knowledge	1. When I lack the knowledge of terminal care	0.673	0.84	0.64	0.757	0.971	0.832
	2. When terminal nursing care provided by nurses is inconsistent	0.855			0.851	0.970	
	3. When there is a lack of detailed guidelines related to terminal care of dying children	0.864			0.803	0.971	
Factor 5: Restricted working environment	13. When I am unable to give sufficient time to the bereaved family after the child's death	0.885	0.91	0.84	0.842	0.971	0.910
	14. When I cannot offer a private space for the ill child, who is about to pass away, and his or her parents	0.944			0.775	0.971	
KMO coefficient	0.954						
Barlett test	4360.063; $p < 0.001$						
Total Cronbach's α :	0.972						

KMO, Kaiser-Meyer-Olkin coefficient; AVE, average variance extracted; and CR, critical ratio.

Table 4. Half-half reliability of the scale

Reliability statistics			
Cronbach's alpha	Part 1	Value	0.939
		Number of items	11
	Part 2	Value	0.964
		Number of items	11
Number of items			22
Correlation between forms			0.873
Spearman–Brown coefficient	Equal length	0.932	
	Unequal length	0.932	
Guttman split-half coefficient			0.931

Limitations

Although this study has strengths, it has some limitations. The sample of the study consisted of pediatric nurses working in university and state hospitals in the east and west regions of Turkey. This may increase the risk of selection bias, reduce representativeness, and therefore the study results may not be generalizable. Intercultural comparisons could not be made since there was no validity and reliability study of the scale in different languages.

In this study, 18 of the participants did not answer all the questions in the survey, and the surveys of these participants (considering incomplete, inaccurate, and low-confidence data) were excluded from the evaluation.

Also in the study, direct CFA was performed without exploratory factor analysis. Factor analysis has 2 main purposes; the first is to reduce the number of variables (reducing size) and the second is to classify the variables. However, there is a suggestion that direct CFA can be done instead of exploratory factor analysis in the process of adapting the measurement tool (Seçer 2020). Therefore, in this study, only CFA was performed to test the reliability of the scale. There is no other previously validated scale used to assess the end-of-life care or palliative care stress of pediatric nurses in Turkey. Therefore, concurrent validity could not be tested. Since the data of this study were collected online, the split-half method was preferred instead of the test–retest, considering that it would be difficult to reach and apply the same participants under similar conditions.

Conclusion

As a result of this study, it was found that the scale is a valid, reliable, and objective measurement tool in evaluating the stress levels of pediatric nurses performing end-of-life care to children in Turkey.

The use of the scale in clinical practice

Clinicians, psychologists, and all health professionals can use this scale, which aims to evaluate the stress of pediatric nurses who care for children and their families in their working environments. Thus, it can contribute to the planning of intervention attempts to alleviate the stress levels of pediatric nurses and to provide better nursing care services.

Also, it is considered that bringing this scale to the literature will enable the examination of the stress levels and affecting factors of pediatric nurses performing end-of-life care to children in different

cultures and contribute to the field by providing an intercultural comparison. It is also recommended to be used on different regions and sample groups.

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References

- Adistie F, Lumbantobing VBM and Maryam NNA (2019) The needs of children with terminal illness: A qualitative study. *Child Care in Practice* **26**, 257–271.
- Akay G and Aytakin Özdemir A (2021) Validity and reliability of the neonatal palliative care attitude scale in Turkey. *Florence Nightingale Journal of Nursing* **29**(2), 212–220. doi:10.5152/FNJJN.2021.20041
- Aksakal H (2018) Palyatif bakım hemşireliği. In Aksakal H, Kahveci K and Koç O (eds), *Palyatif Bakım Hemşireliği El Kitabı*. Ankara: Akademisyen Kitabevi, 15–23.
- Almanasreh E, Moles R and Chen TF (2019) Evaluation of methods used for estimating content validity. *Research in Social & Administrative Pharmacy: RSAP* **15**(2), 214–221. doi:10.1016/j.sapharm.2018.03.066
- Alshammari F, Sim J, Lapkin S, et al. (2022) Registered nurses' knowledge, attitudes and beliefs about end-of-life care in non-specialist palliative care settings: A mixed studies review. *Nurse Education in Practice* **59**, 1–13. doi:10.1016/j.nepr.2022.103294
- Aroian KJ and Norris AE (2007) Assessing PTSD in Arab immigrants. Paper presented at the 21st Annual Meeting of the American Psychiatric Nurses Association (APNA), Kissimee, FL.
- Bayram N (2011) *Introduction to Structural Equation Modeling- Amos Applications*. Istanbul: Ezgi Bookstore.
- Bloomer MJ, O'Connor M, Copnell B, et al. (2015) Nursing care for the families of the dying child/infant in paediatric and neonatal ICU: Nurses' emotional talk and sources of discomfort. A mixed methods study. *Australian Critical Care* **28**(2), 87–92. doi:10.1016/j.aucc.2015.01.002
- Boateng GO, Neilands TB, Frongillo EA, et al. (2018) Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health* **6**, 149. doi:10.3389/fpubh.2018.00149
- Brown TA (2015) *Confirmatory Factor Analysis for Applied Research*, 2nd edn. New York: The Guilford Press.
- Browne MW and Cudeck R (1993) Alternative ways of assessing model fit. In Bollen KA and Long JS (eds), *Testing Structural Equation Models*. Newbury Park, CA: Sage, 136–162.
- Büyükköztürk Ş (2002) Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı. *Kuram Ve Uygulamada Eğitim Yönetimi* **32**(32), 470–483.
- Chakrabartty S and Nath Chakrabartty S (2013) Best split-half and maximum reliability. *Journal of Research & Method in Education* **3**(1), 1–8.
- Chan WL, Lam KO, Siu WK, et al. (2016) Chemotherapy at end-of-life: An integration of oncology and palliative team. *Supportive Care in Cancer* **24**(3), 1421–1427.
- Chew YJM, Ang SLL, Shorey S, et al. (2021) Experiences of new nurses dealing with death in a paediatric setting: A descriptive qualitative study. *Journal of Advanced Nursing* **77**(1), 343–354. doi:10.1111/jan.14602
- Connor SR, Downing J and Marston J (2017) Estimating the Global Need for Palliative Care for Children: A Cross-sectional Analysis. *Journal of Pain and Symptom Management* **53**, 171–177.
- Davis LL (1992) Instrument review: Getting the most from a panel of experts. *Applied Nursing Research* **5**, 194–197. doi:10.1016/S0897-1897(05)80008-4
- Erci B and Aslan H (2022) Validity and reliability of the Turkish version of the spiritual needs assessment scale of patients with cancer. *Palliative & Supportive Care* **20**(5), 671–677. doi:10.1017/S1478951521001103
- Fernando GMVC and Hughes S (2019) Team approaches in palliative care: A review of the literature. *International Journal of Palliative Nursing* **25**(9), 444–451. doi:10.12968/ijpn.2019.25.9.444

- Ferrell B, Virani R, Paice JA, et al.** (2010) Evaluation of palliative care nursing education seminars. *European Journal of Oncology Nursing* **14**, 74–79. doi:10.1016/j.ejon.2009.08.004
- Finch HW** (2019) *Exploratory Factor Analysis*. Sage Publications.
- Geum MJ, Ahn JH, Kim JS, et al.** (2019) Interprofessional collaboration between a multidisciplinary palliative care team and the team pharmacist on pain management. *American Journal of Hospice and Palliative Medicine* **36**(7), 616–622. doi:10.1177/1049909119829047
- Hair J, Black W, Babin B, et al.** (2010) *Multivariate Data Analysis*, 7th edn. Prentice-Hall.
- Harrington D** (2009) *Confirmatory Factor Analysis*. New York: Oxford University Press.
- Jang SH** (2013). Neonatal intensive care unit nurses' stress of end-of-life care for high-risk newborn. Master's thesis. Seoul, Korea: Ewha Womans University.
- Jang SK, Park WH, Kim H-I, et al.** (2019) Exploring nurses' end-of-life care for dying patients in the ICU using focus group interviews. *Intensive and Critical Care Nursing* **52**(1), 3–8. doi:10.1016/j.iccn.2018.09.007
- Kim H and Kim K** (2020) Palliative cancer care stress and coping among clinical nurses who experience end-of-life care. *Journal of Hospice & Palliative Nursing* **22**(2), 115–122. doi:10.1097/NJH.0000000000000624
- Knaul FM, Farmer PE, Krakauer EL, et al.** (2018) Alleviating the access abyss in palliative care and pain relief—an imperative of universal health coverage: The Lancet Commission report. *The Lancet* **391**, 1391–1454.
- Kudubeş A, Özkan S, Semerci R, et al.** (2022) Status of palliative care course in undergraduate and postgraduate nursing programs: Practice of Turkey. *Turkish Journal of Pediatric Emergency and Intensive Care Medicine* **9**, 17–26. doi:10.4274/cayd.galenos.2021.00922
- Marsh HW, Guo J, Dicke T, et al.** (2020) Confirmatory factor analysis (CFA), exploratory structural equation modeling (ESEM), and set-ESEM: Optimal balance between goodness of fit and parsimony. *Multivariate Behavioral Research* **55**(1), 102–119. doi:10.1080/00273171.2019.1602503
- Mayland C, Sunderland K, Fraser L** (2022) Measuring quality of dying, death and end-of-life care for children and young people: A scoping review of available tools. *Palliative Medicine* **36**(8), 1186–1206.
- Meydan CH and Şenen H** (2011) *Structural Equation Modeling, AMOS Applications*. Ankara: Detay Publishing.
- Morgado FFR, Meireles JF, Neves CM, et al.** (2017) Scale development: Ten main limitations and recommendations to improve future research practices. *Psicologia: Reflexão e Crítica* **30**(1), 1–20. doi:10.1186/s41155-016-0057-1
- Muscat DM, Shepherd HL, Morony S, et al.** (2016) Can adults with low literacy understand shared decision making questions? A qualitative investigation. *Patient Education and Counseling* **99**(11), 1796–1802. doi:10.1016/j.pec.2016.05.008
- Nia HS, Lehto RH, Ebadi A, et al.** (2016) Death anxiety among nurses and health care professionals: A review article. *International Journal of Community Based Nursing and Midwifery* **4**(1), 2–10.
- Nunnally JC and Bernstein IH** (2010) *Psychometric Theory*. McGraw-Hill.
- O'Brien MR, Kinloch K, Groves KE, et al.** (2019) Meeting patients' spiritual needs during end-of-life care: A qualitative study of nurses' and healthcare professionals' perceptions of spiritual care training. *Journal of Clinical Nursing* **28**(1–2), 182–189.
- Park SY** (2018). Development of stress scale for nurses caring dying children. Dissertation. Busan, Korea: Dong-A University.
- Park KY and Jeong JH** (2021) The relationships of end-of-life care stress with compassionate competence and attitudes toward end-of-life care among pediatric nurses. *The Korean Journal of Hospice and Palliative Care* **24**, 235–244. doi:10.14475/jhpc.2021.24.4.235
- Park SY and Ju HO** (2020) Development of an instrument to measure stress in Korean nurses performing end-of-life care for children. *Journal of Pediatric Nursing* **54**, 84–90. doi:10.1016/j.pedn.2020.05.006
- Pearson HN** (2013) You've only got one chance to get it right: Children's cancer nurses' experiences of providing palliative care in the acute hospital setting. *Issues in Comprehensive Pediatric Nursing* **36**(3). doi:10.3109/01460862.2013.797520
- Peters L, Cant R, Payne S, et al.** (2013) How death anxiety impacts nurses' caring for patients at the end of life: A review of literature. *The Open Nursing Journal* **7**, 14–21. doi:10.2174/1874434601307010014
- Peterson JL, Johnson MA, Halvorsen B, et al.** (2010) What is it so stressful about caring for a dying patient? A qualitative study of nurses' experiences. *International Journal of Palliative Nursing* **16**, 181–187. doi:10.12968/ijpn.2010.16.4.47784
- Polit DF, Beck CT, Owen SV, et al.** (2007) Focus on research methods: Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health* **30**, 459–467. doi:10.1002/nur.20199
- Polit D and Hungler BP** (1999) *Nursing Research: Principles and Methods*. Philadelphia: Lippincott Company.
- Ranallo L** (2017) Improving the quality of end-of-life care in pediatric oncology patients through the early implementation of palliative care. *Journal of Pediatric Oncology Nursing* **34**(6), 374–380. doi:10.1177/1043454217713451
- Sansó N, Vidal-Blanco G and Galiana L** (2021) Development and Validation of the Brief Nursing Stress Scale (BNSS) in a Sample of End-of-Life Care Nurses. *Nursing Reports* **11**(2), 311–319.
- Seçer İ** (2020). *Psikolojik test geliştirme ve uyarlama süreci: SPSS ve LISREL uygulamaları*. Anı yayıncılık.
- Şencan H** (2005) *Sosyal Ve Davranışsal Ölçümlerde Güvenilirlik Ve Geçerlilik*, 1st edn. Ankara: Seçkin Yayıncılık.
- Şimşek ÖF** (2007) *Introduction to Structural Equation Modeling, Basic Principles and LISREL Applications*. Ankara: Equinox, 4–22.
- Tabachnick BG and Fidell LS** (2007) *Using Multivariate Statistics*, 5th edn. Boston, MA: Allyn & Bacon.
- Tamaki T, Inumaru A, Yokoi Y, et al.** (2019) The effectiveness of end-of-life care simulation in undergraduate nursing education: A randomized controlled trial. *Nurse Education Today* **76**, 1–7.
- Xia Y and Yang Y** (2019) RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavior Research Methods* **51**(1), 409–428. doi:10.3758/s13428-018-1055-2
- Zheng R, Lee SF, Bloomer MJ, et al.** (2016) How new graduate nurses experience patient death: A systematic review and qualitative meta-synthesis. *International Journal of Nursing Studies* **53**, 320–330. doi:10.1016/j.ijnurstu.2015.09.013