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Original Research

Nurses' Cancer Pain Management Competence Scale: Turkish Validity and Reliability Study

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ABSTRACT

Aim: The aim of this study was to adapt the Nurses' Cancer Pain Management Competency Scale into Turkish and to examine the validity and reliability of the scale.
Methods: This methodological study was conducted with 244 nurses who were working in Turkey between July 2023 and May 2024. Data were collected online by using "Personal Information Form" and "Nurses' Cancer Pain Management Competency Scale (NCPMCS)." In the analysis of the data, Cronbach's alpha, Kaiser Meyer Olkin (KMO) and Barlet's sphericity test, fit indices, Average variance extracted (AVE) and Composite reliability (CR) were assessed. Maximum shared squared variance (MSV) and Average shared squared variance (ASV) were evaluated for divergent validity.
Results: The factor loadings of the scale items were found to vary between 0.740 and 0.970. The fit indices of the scale were found as follows: $X^2 = 170.38$, df = 69 ($p < .05$), $X^2/df = 2.49$, RMSEA = 0.078, CFI = 0.97, RMR = 0.027, SRMR = 0.043 and TLI = 0.96. The Cronbach's alpha values of the scale subdimensions ranged between 0.888 and 0.931 and the overall Cronbach's alpha coefficient was 0.828. The validity of the Turkish version of Nurses' Cancer Pain Management Competency Scale was established without any changes in the original scale form.
Conclusion: "Nurses" Cancer Pain Management Competency Scale" Turkish form is a valid and reliable measurement tool to evaluate the competencies of nurses in cancer pain management and to be used in clinical practice.

Pain in cancer patients is a serious concern and is one of the most common symptoms reported by patients (Snijders et al., 2023). The pain experience reduces the quality of life by negatively affecting the patient in many ways (Cramer et al., 2018; Ośmiałowska et al., 2021). In addition to the general morbidity brought on by cancer, the lack of pain control in a cancer patient causes the patient to be adversely affected physically and mentally, and their quality of life and social communication deteriorate, thus entering a vicious circle (Buğdaycı, 2023). Although there have been improvements in pain assessment and management of cancer patients, the prevalence of cancer pain has not decreased (Van Den Beuken-Van et al., 2016). Opioid analgesic use is also increasing, although there are regional differences (Ju et al., 2022).

Pain management is the reduction or control of pain by assessment and treatment of pain (Lou & Shang, 2017). Although cancer pain is a long-standing problem, the assessment and effective management of pain is a major challenge due to the subjective nature of pain and the complexity of the underlying diseases (Erol et al., 2018; Fink & Gallagher, 2019). Barriers to cancer pain management are multifaceted and can be attributed to several factors. Aside from the complex nature of cancer pain, one of the main barriers is inadequate pain assessment, as healthcare professionals often fail to accurately evaluate and document patients' pain levels. A lack of knowledge about pain management among healthcare providers, particularly nurses, is another prevalent barrier that hinders effective pain control (Alsaiari et al., 2024). Therefore, nurses play a central role in pain management to ensure continuity of

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care (Al-Atiyyat et al., 2019; Chatchumni et al., 2020; Siler et al., 2019). Pain management is still inadequate for many cancer patients. Nurses play an important role in managing pain but often lack the necessary knowledge and training. Addressing barriers and improving pain management education for nurses is important to improving the quality of life for cancer patients (Alsaiari et al., 2024).

Inaccurate assessment and management of pain by nurses leads to negative health outcomes. Competence of nurses in cancer pain management is generally considered inadequate (Bouya et al., 2019) and nurses regard pain management as a challenging task (Jung & Matthews, 2021). Poor pain control is also associated with greater psychological distress and reduced social activities and social support. Conversely, increased symptom monitoring and patient self-reporting of pain have been shown to improve quality of life, reduce unexpected healthcare utilization, and improve adherence to anti-neoplastic therapy (Scarborough & Smith, 2018). Therefore, specialised training is needed not only to increase awareness of the role of nurses but also to increase nurse pain management competence in optimal cancer pain management. In order to develop effective training programs, the use of measurement tools that assess competencies in pain management may be useful (Cousins et al., 2022; Jung & Matthews, 2021).

In a study on pain management competence, pain management competence was measured by using a measurement tool that focused on knowledge and self-efficacy (Hassan et al., 2018). In another study, a "Pain Competency Assessment Tool" designed to measure core competencies focusing on chronic pain was developed. This measurement tool was developed based on the pain management core competencies framework, which emphasises the essential skills and knowledge that every clinician should have to identify, assess and treat pain. According to the studies conducted, existing tools only focus on pain management knowledge and attitude (Hassan et al., 2022).

Pain management can be challenging for nurses due to lack of knowledge and training experience (Bouya et al., 2019; Cousins et al., 2022). In order to develop a competency-based education program, self-perceived cancer pain management competency levels of nurses should be determined accurately. Assessing pain management competence by using a tool with reliability and validity will pave the way for creating a more comprehensive pain management education curriculum for nurses. Therefore, there is a need for a reliable and valid measurement tool to assess competencies of nurses in cancer pain management.

The Nurses' Cancer Pain Management Competency Scale (NCPMCS) developed by Hu and Roh (2023) measures comprehensive domains of pain management competence in nurses. Cultural adaptations of the Chinese and Italian versions have been performed (Luo et al., 2024; D'Amico et al., 2024). NCPMCS is a comprehensive measurement tool that evaluates the pain management competence of nurses with the sub-dimensions of "context of pain management," "pain assessment and measurement," "management of pain" and "multidimensional nature of pain." The concepts obtained in the scale support the basic concepts of cancer pain management and the roles and responsibilities of nurses in this area. NCPMCS can be used as a needs assessment tool for nurses and as an assessment tool to assess learning outcomes after their education (Hu & Roh, 2023). No measurement tool has been found to assess the competence of nurses in cancer pain management in Turkey. It is a measurement that can be used as a tool in studies to evaluate the competence of nurses who play a key role in cancer pain management and to improve the competence of nurses in this area. For this reason, it has a special importance and there is no Turkish measurement tool with these features. Therefore, this study was conducted to adapt the Nurses' Cancer Pain Management Competency Scale (Hu & Roh, 2023) into Turkish and to examine the validity and reliability of the scale.

Methods

Type of Research: This methodological study was conducted to evaluate the validity and reliability of the Turkish version of Nurses' Cancer Pain Management Competency Scale.

Population and Sample

The study was conducted between July 2023 and May 2024 by using the "snowball sampling method," which is one of the non-random sampling methods. In snowball sampling method, the sampling process starts by reaching one of the individuals to be researched. The researcher tries to reach new individuals by asking them who else they can interview (Şahin, 2014). The inclusion criteria for the study were determined as "having worked or still working in oncology units and providing care to patients with cancer pain." Data collection forms prepared with Google Docs were sent online (via e-mail, WhatsApp) to nurses working in Turkey, and they were asked to fill in the forms and share them with the nurses around them. A total of 620 individuals were reached with the online survey form. Since 290 individuals did not meet the inclusion criteria (providing care to cancer patients and filling the survey form in 1-2 minutes) and 86 individuals did not consent to answer the survey, the study was completed with 244 nurses. It is important that the sample size is large enough to ensure that the correlations can be estimated reliably. Different definitions are made about this number according to the reliability of the relationship and the number of significant factors. As a general rule, it is also stated that the sample size should be at least five or even ten times the number of observed variables (Büyüköztürk, 2002; Tavşancıl, 2005). Therefore, the number of the sample was determined as at least 140 people by taking ten times for this scale which consists of 14 items. Therefore, the study was finalised with 244 nurses. In order to determine the invariance of the scale against time, the scale was reapplied to the same group two weeks later.

Data Collection Tools

Personal Information Form and Nurses' Cancer Pain Management Competency Scale (NCPMCS) were used to collect the data.

Personal Information Form: This form, which was created by the researchers, consists of questions to determine the sociodemographic and working status of the nurses such as age, gender, educational status, marital status, years of employment, and the clinic where they worked.

Nurses' Cancer Pain Management Competency Scale: The scale was developed by Hu and Roh in 2023 to determine the competence of nurses to manage cancer pain. The scale consists of 14 items and 4 sub-dimensions "Clinical conditions, pain assessment and measurement, pain management." The scale includes "5 items" describing "nurses' competence to create a pain management strategy and timely pain health education," 5 items" describing "competence to assess and measure cancer pain," "2 items" describing "competence to manage cancer pain" and "2 items" describing "competence to understand the multidimensional nature of cancer pain." This instrument utilizes a 4-point Likert scale. The items are scored between 1 and 4. "1 is classified as very difficult (bad)," "2 as somewhat difficult (average)," "3 as almost OK (good)" and "4 as very good (excellent)." A high score indicates that the nurse's

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competence in managing cancer pain is at a good level. The Cronbach α value of the original scale was 0.890 and the Cronbach α value of each factor ranged between 0.690 and 0.830 (Hu & Roh, 2023).

Implementation of Data Collection Tools

After obtaining the necessary permissions for the implementation, the data were collected between July 2023 and May 2024. The data collection tools prepared electronically through Google forms were shared with the nurses who experienced cancer pain and agreed to participate in the study. Nurses were informed about the principles of confidentiality and their consent was obtained.

Adaptation Process

The scale was adapted to Turkish in three stages.

First Stage: The first stage is the translation stage of the scale. The original form of the scale was translated from English into Turkish by two language experts separately. The translated scale was sent to two experts in Turkish language and five expert nurses in the field of internal medicine nursing for expert opinion (Çapık et al., 2018).

Content validity is the extent to which the scale as a whole and each item in the scale serves the purpose. For content validity, the opinions of experts are taken. After the opinions of the experts, the content validity index (CVI) was calculated. Since there was no item with a score below 0.80 on the scale, no item was omitted (Polit & Beck, 2008).

After the opinions received from the experts, the wording of some items was revised and the scale was translated into English again by sending it to two experts in the field of English. The initial and final versions of the scale were compared and it was determined that there was no semantic change in the scale. After the expert opinions, the scale was ready for pilot application (Çapık et al., 2018).

Second Stage: After translation, adaptation should be made, the adapted version should be reviewed and changes should be made if necessary. After the adaptation, the scale should be applied to the pilot group and it should be checked whether there are any other corrections to be made about the scale. The characteristics of the pilot group should be similar to the characteristics of the group in which the actual implementation of the scale will be carried out (Karakoç & Dönmez, 2014). In the pilot application phase, the item correlation value of the scale items should be above 0.30 and the Cronbach's alpha value should be above 0.70 (DeVellis & Thorpe, 2021; Seçer, 2018; Shrestha, 2021) In the study, 30 nurses were reached for the pilot application phase. In the subsequent analysis, it was determined that the item correlation value of all items of the scale was above 0.30 and the Cronbach's Alpha value was above 0.70. Therefore, no item was omitted from the scale and the implementation phase of the scale was started with 14 items.

Third Stage: In the implementation stage, firstly, the data collection forms were transferred to the online environment via Google Forms. The data were collected from a total of 283 nurses caring for cancer patients by reaching the nurses with the snowball method. Form replication method (time invariance) is the implementation of a measurement tool twice to the same subject group, under the same conditions and within a certain time interval. The correlation coefficient of the measurement values obtained from two applications is the reliability coefficient of the scale (Karakoç & Dönmez, 2014). In scale adaptation, it is recommended to administer the retest between 15 and 30 days (Alpar, 2022; Seçer, 2018). In this study, the retest was administered at 15-day interval.

Statistical Analysis

The data obtained from the study were analysed with SPSS 27 and LISREL software. Firstly, Skewness and Kurtosis values (+2 and -2 range) and histogram graphs were examined to determine the normality values of the data obtained. Item total correlation values and total Cronbach's alpha values of the scale items were analysed. Kaiser Meyer Olkin (KMO) and Barlet's sphericity test were used to determine the suitability of the data set and sample size for analysis. In order to determine the construct validity of the scale, the data were analysed in Lisrel package program and fit indices (Relative Chi Square Index (CMIN/DF), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker Lewis Index (TLI) Standardized Root Mean Square Residual (SRMR), Root Mean Square Residual (RMR) were determined. Cronbach's alpha coefficients and McDonald Omega reliability analysis were conducted to determine the reliability of the scale. Retest method was used to determine the invariance of the scale against time (Seçer, 2018). Average variance extracted (AVE) and Composite reliability (CR) were assessed for convergent validity (Alarcón et al., 2015). Maximum shared squared variance (MSV) and Average shared squared variance (ASV) were evaluated for divergent validity.

Ethical Considerations

Before starting the study, approval was obtained from the non-interventional research ethics committee of a university. Before the scale was translated, permission was taken from the author of the original scale. The individuals included in the study were provided with the necessary explanations about the purpose of the research and the method of application together with the link. Their consent was obtained by explaining that the research was based on the principle of volunteerism and that the information would remain confidential.

Results

In the study, a total of 244 participants were reached and it was found that the mean age of the participants was 30.50± 7.48 years, their total working years were 8.58±7.74 and their working years in their current clinic were 3.61±4.75. It was found that 79.1% of the participants were female, 64.3% were single, 68.9% had a bachelor's degree or higher, 14.8% had previously worked in an oncology clinic, and 85.2% were currently working in an oncology clinic.

Validity Results

Content Validity

In the study, item-based content validity index (I-CVI) was between 0.87 and 1.00, and scale-based content validity index (S-CVI) was found to be 0.98.

Construct Validity

Before conducting construct validity, KMO and Barlett's Sphericity Test were conducted to check the suitability of the sample size and the suitability of the data set for analysis. It was determined that the KMO value was 0.814. Barlett's Test of Sphericity was found to be significant ($x2 = 2777.484$; $p = .000$). CFA analysis was conducted before EFA to show the validity of the existing 14-item and 4 sub-dimension structure. As a result of CFA analysis, factor loadings were above .30 (ranging between 0.740-0.970) and 4 sub-dimension structure was confirmed (Table 1).

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Table 1
Mean, Item Correlation Coefficient and CFA Factor Load Results

Scale Items	Mean±SD	Corrected Item-total Correlations	Factor Load Values			
			F1	F2	F3	F4
Item 1	2.61 ± 0.73	0.430	0.740			
Item 2	2.69 ± 0.73	0.472	0.890			
Item 3	2.71 ± 0.75	0.592	0.910			
Item 4	2.72 ± 0.78	0.508	0.910			
Item 5	2.69 ± 0.76	0.551	0.820			
Item 6	2.50 ± 0.81	0.573		0.820		
Item 7	2.38 ± 0.86	0.591		0.840		
Item 8	2.46 ± 0.81	0.602		0.910		
Item 9	2.48 ± 0.82	0.518		0.870		
Item 10	2.49 ± 0.81	0.605		0.830		
Item 11	2.87 ±0.69	0.512			0.880	
Item 12	2.92 ± 0.73	0.522			0.910	
Item 13	2.62 ± 0.91	0.469				0.970
Item 14	2.70 ±0.96	0.463				0.870

Table 2
Confirmatory Factor Analysis Results

Fit criteria	Found	Appropriate	Acceptable	Result
x^2/df (**CMIN/DF**)	2.46	<2	<5	Acceptable fit
RMSEA	0.078	<0.05	<0.08	Acceptable fit
CFI	0.97	>0.95	>0.90	Excellent fit
RMR	0.027	<0.05	<0.08	Excellent fit
SRMR	0.043	<0.05	<0.08	Acceptable fit
TLI	0.96	>0.95	>0.90	Excellent fit

CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; RMR = Root Mean Square Residual; SRMR = Standardized Root Mean Square Residual; TLI = Tucker.

Confirmatory Factor Analysis

According to the results of the analyses, CFA fit index values were found as follows: X2 = 170.38, df = 69 (p < .05), X2/df = 2.49, RMSEA = 0.078, CFI = 0.97, RMR = 0.027, SRMR = 0.043 and TLI = 0.96 (Table 2). The PATH diagram generated during confirmatory factor analysis is shown in Figure 1. In evaluating the covariance obtained by the model, evaluating the proposed model's goodness of fit, which reflects how well the model fits the observed data, is a critical step in CFA (Alavi et al. 2020). If the X2/ df coefficient takes a value between 2 and 5, it indicates that it is at an acceptable level. A RMSEA value between 0.05 and 0.08 is considered a good fit. For CFI and TLI indices, the good fit value is stated as >0.95 (Karaman, 2023). RMR and SRMR values below 0.08 correspond to a good fit (Çapık 2014).

When Table 3 was examined, a significant correlation was observed between the sub-dimensions of the scale. The moderate correlations obtained showed that there was no multicollinearity problem between the sub-dimensions.

Reliability Results

Cronbach's alpha coefficient of the scale was calculated. Cronbach's alpha coefficient was 0.931 for "F1" sub-dimension, 0.930 for "F2" sub-dimension, 0.888 for "F3" sub-dimension, 0.916 for "F4" sub-dimension and 0.828 for the total scale. In this study, AVE value was 0.734 and composite reliability CR value was 0.932 for "F1" sub-dimension; AVE value was 0.730 and CR value was 0.931 for "F2" sub-dimension; AVE value was 0.534 and CR value was 0.696 for "F3" sub-dimension; and AVE value was 0.566 and CR value was 0.722 for "F4" sub-dimension. As a result, it was found that all CR values were greater than AVE values and AVE values were greater than the critical value of 0.50 (Table 3). When the item-total correlation coefficients of the scale were analysed, it was found that all item-total correlation coefficients were above .30 (0.430-.0.605) (Table 2).

During the research process, in order to evaluate the consistency of the scale over time, the correlation values observed between the test-retest measurements applied to 30 people 15 days apart were as follows: r = 0.929 for NCPMCS total, r = 0.375 for "F1" sub-dimension, r = 0.956 for "F2," r = 0.566 for "F3" and r = 0.769 for "F4." These correlation values are statistically significant (p < .01). Also, no statistically significant difference was found between the test-retest measurement results (Table 4) (p>0.05).

Discussion

The study was conducted to ensure the Turkish validity and reliability of the "Nurses" Cancer Pain Management Competency Scale' which consists of 14 items and 4 sub-dimensions. This instrument utilizes a 4-point Likert scale. The findings obtained were discussed in line with the literature.

Content Validity

The draft form prepared from the original version of the scale was sent for translation, which is known as the first step of the adaptation process (Borsa et al., 2012; Çapık et al., 2018), and the scale form translated by language experts was sent to experts in the field. In the original version of the scale, the scale-based content validity index (S-CVI) value was found to be 0.96 (Hu & Roh, 2023). In the Chinese validity and reliability study, the S-CVI value was found to be 0.98 (Luo et al., 2024). In the Italian version of the scale, the S-CVI value was 0.848 (D'Amico et al., 2024). Similar results were found in the Turkish validity and reliability study and the S-CVI was found to be 0.98. According to the literature, a CVI analysis result greater than 0.80 indicates that the scale is sufficient in terms of content validity (Polit & Beck, 2008). For this reason, the (S-CVI) 0.98 value obtained from the study shows that there is a high level of agreement between the expert opinions and that the items are sufficient to measure the related subject.

Construct Validity

Before factor analysis, KMO and Barlett's Sphericity Test were conducted to evaluate the suitability of the sample size and the suitability of the data set for factor analysis. Barlett's Test of Sphericity was found to be significant. KMO value was found to be 0.814. In the original version of the scale, the KMO value

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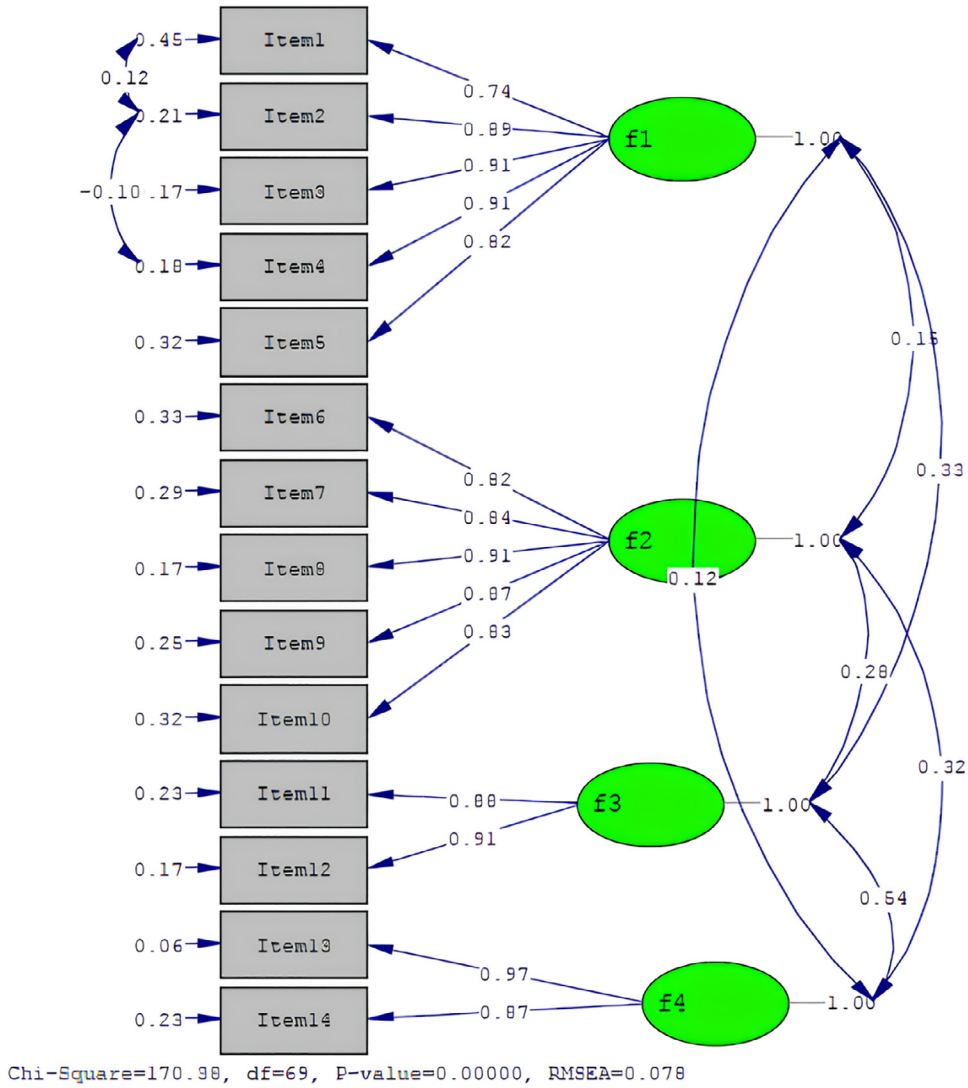

Figure 1. PATH Diagram Regarding the Factor Structure of the Scale.

Table 3
Correlation Values, Mean Scores and Reliability Results

Scale and sub-dimensions	F1	F2	F3	F4	Number of items	X ± SD	α	AVE	CR
F1	1	.			5	2.68±0.66	0.931	0.734	0.932
F2	.149**	1	.		5	2.46±0.73	0.930	0.730	0.931
F3	.334**	.254**	1	.	2	2.89±0.67	0.888	0.534	0.696
F4	.131**	.318**	.485**	1	2	2.66±0.90	.0.916	0.566	0.722
NCPMCS Total	.667**	.741**	.624**	.593**	30	2.63±0.49	0.869		

** Correlation is significant at the 0.01 level (2-tailed).F = Factor; NCPMCS = Nurses' Cancer Pain Management Competency Scale; X = Mean; SD = Standard deviation; a = Cronbach's alpha coefficients; F1 = Clinical conditions; F2 = Pain assessment and measurement; F3 = Management of pain; F4 = Multidimensional nature of pain.

Table 4
Test-Retest Results and Mean Scores (n = 30)

Scale and sub-dimensions	Scale Score Means		Analysis Results			
	First Implementation X ± SD	Second Implementation X ± SD	r	p	t	p
F1	2.92±0.14	2.90±0.15	0.375**	.000	1.361	.84
F2	1.43±0.41	1.47±0.38	0.956**	.000	-1.795	.083
F3	3.75±0.34	3.58±0.55	0.566**	.000	1.980	.057
F4	3.06±0.25	2.98±0.35	0.769**	.000	1.980	.0.057
NCPMCS Total	2.53±0.19	2.50±0.22	.929**	.000	1.884	.070

** Correlation is significant at the 0.01 level (2-tailed); F: Factor; $p < .05$; r = Pearson Correlation Coefficient; t: t = Paired sample t test, NCPMCS = Nurses' Cancer Pain Management Competency Scale; F1: Clinical conditions; F2 = Pain assessment and measurement; F3 = Management of pain; F4: Multidimensional nature of pain

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was also found to be 0.814 (Hu & Roh, 2023). In this context, the values found in this study show that the relationship between the variables is suitable for factor analysis (DeVellis & Thorpe, 2021; Pallant, 2020) Confirmatory factor analysis (CFA) was conducted before exploratory factor analysis (EFA) to verify the structure, which was previously constructed as 14 items and 4 subdimensions. For the scale, the factor loading value should be above 0.30 (Finch, 2019; Seçer, 2018). As a result of CFA analysis, factor loadings were found to be above .30 (ranging between 0.740-0.970) and the 4 sub-dimension structure was confirmed.

Acceptable levels of fit indices as a result of CFA are CMIN/DF <5, RMSEA and SRMR <0.08, and TLI > 0.90 (Aksu et al., 2017; Bae, 2017; Erkorkmaz et al., 2013). In the Chinese validity and reliability study, RMSEA value was 0.090 and X2/df = 2.78 (Luo et al., 2024). According to the analysis conducted in the Turkish validity and reliability study, CFA fit index results were X2 = 170.38, df = 69 ($p < .05$), X2/df = 2.49, RMSEA = 0.078, CFI = 0.97, RMR = 0.027, SRMR = 0.043 and TLI = 0.96. In this context, it was determined that the fit indices of the scale were at an acceptable level and the scale structure consisting of 14 items and 4 sub-dimensions and the Turkish validity were confirmed.

Reliability Analysis

In the study, Cronbach's alpha coefficient was calculated to determine the reliability of the scale. Cronbach's alpha value for the total scale was 0.828. Cronbach's alpha values in terms of subdimensions were 0.931 for "F1" sub-dimension, 0.930 for "F2" subdimension, 0.888 for "F3" sub-dimension, and 0.916 for "F4" subdimension. The total scale Cronbach's alpha value in the original scale was 0.89. Cronbach's alpha values of sub-dimensions vary between 0.69 and 0.83 (Hu & Roh, 2023). In the Chinese version of the scale, the total Cronbach's alpha value was 0.902, and Cronbach's alpha values for the sub-dimensions ranged from between 0.800 and 0.938 (Luo et al., 2024). In the Italian version, the total Cronbach's alpha value was 0.756. It can be seen that the Cronbach's alpha values obtained from the original version of the scale and the versions in other languages are similar to those obtained in this study and the sub-dimension Cronbach's alpha values in the Turkish validity and reliability study are higher.

For convergent validity, which is one of the methods used to determine validity, AVE and CR values are examined and an AVE value of >0.50 and a CR value of >0.80 indicate that the scale is reliable at a good level (Alarcón et al., 2015; Netemeyer, 2003). In addition, in order to determine convergent validity, the CR value must be greater than the AVE value and the AVE value must be above 0.5 (Yaşlıoğlu, 2017). According to the results obtained from the study, it was determined that all CR values were greater than AVE values and AVE values were greater than the critical value of 0.50. In line with these findings, it can be said that the scale has a high level of reliability.

Item-total correlation coefficients are calculated to examine the relationship between the scale items and other items and the total score, and this value is expected to be above 0.30 (Finch, 2019; Seçer, 2018). The correlation coefficient is interpreted as follows: values of ≥ 0.80 indicate a high correlation, values between 0.60 and 0.80 indicate a strong correlation, values between 0.40 and 0.59 indicate a moderate correlation, values between 0.20 and 0.39 indicate a low correlation and values below 0.20 indicate a weak correlation (Karasar, 2020). In this study, the item-total correlation coefficient was above .30 (0.430-.0.605). At the same time, no statistically significant difference was found between the test-retest measurement results. According to the results found, it can be seen that the scale has a high level of reliability.

Strengths and Limitations

This study applied all necessary steps for the validity and reliability of the scale and the results were found to be sufficient for adaptation for cultural adaptation. This shows that this tool is a valid and reliable measurement tool for Turkish society and is the strength of this study.

Since this is a scale study, it was based on the participants' self-reports. The answers are limited to the answers given by the participants. This is one of the limitations of the study. The scale mainly includes the nurses' self-assessment of their cancer pain management competence. This is not an objective assessment. More studies are needed on objective assessment. This is another limitation of the study.

Conclusion

In the analysis of the data, Cronbach's alpha, Kaiser Meyer Olkin (KMO) and Barlet's sphericity test, fit indices, Average variance extracted (AVE) and Composite reliability (CR) were assessed. Maximum shared squared variance (MSV) and Average shared squared variance (ASV) were evaluated for divergent validity. As a result of the study, it was confirmed that the Turkish version of the scale consisting of 14 items, 4 sub-dimensions and a 4-point Likert scale was consistent with the original version. Cronbach's alpha values and fit indices were similar to the original version. In line with these findings, the Turkish version was found to be identical to the original scale and thus cultural equivalence was achieved. The results of the study showed that the Turkish version of the Nurses' Cancer Pain Management Competency Scale can be used as a valid and convenient measurement tool in the Turkish population. There is no measurement tool in Turkey that evaluates the competence of nurses in managing cancer pain. With this scale, researchers can determine the competence of nurses in managing cancer pain. In addition, evidence-based interventions and training programs can be organized to improve cancer pain management competence. The results of studies aimed at improving the competence of nurses in managing cancer pain can also be evaluated with this measurement tool.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Gülcan Bahcecioglu-Turan: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Nisa Yavuzer-Bayrak:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Seda Başak:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Elanur Yılmaz-Karabulutlu:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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