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The psychometric properties of the Turkish version of the Chemotherapy-Induced Peripheral Neuropathy Assessment Tool (CIPNAT)☆

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A B S T R A C T

Purpose: Chemotherapy-induced peripheral neuropathy is a common treatment-related adverse effect. It adversely affects the quality of life. Therefore, it is important to evaluate symptoms. The purpose of this study was to evaluate the validity and reliability of Chemotherapy-Induced Peripheral Neuropathy Assessment Tool in Turkish patients.

Methods: A convenience sample of 327 patients, being treated with peripheral neurotoxic chemotherapeutic agents were asked to fill in the questionnaire. The data was evaluated using SPSS 21 (SPSS Inc., Chicago IL, USA) statistical software. The verification of the structure obtained with CFA was provided by AMOS 21.0. Psychometric testing included internal consistency reliability (Cronbach's alpha coefficient and item-total correlations), test-retest reliability, validity (exploratory factor analysis, confirmatory factor analysis and concurrent validity).

Results: The Cronbach alpha value of the scale was 0.97. The test-retest reliability results were significantly high. The CIPNAT significantly correlated with the European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire Chemotherapy-Induced Peripheral Neuropathy. The model was validated by confirmatory factor analysis ($\chi 2/sd = 2.74$, GFI = 0.95, AGFI = 0.92, CFI = 0.98, RMSEA = 0.07, and RMR = 0.009).

Conclusions: The Turkish version of the CINAT was found to be reliable and valid with Turkish patients receiving chemotherapy. Use of the CIPNAT may lead to a better understanding of symptom. The CIPNAT can be used in future nursing research and practice as an assessment tool for peripheral neuropathy in patients with cancer who undergo chemotherapy.

1. Introduction

Peripheral neuropathy is one of the most common adverse effects of chemotherapy on the neurological system (Kannarkat et al., 2008). The pathophysiology of peripheral neuropathy has not yet been explained in depth. Peripheral neuropathy is an adverse effect that occurs due to distortion in the electrical activity of neurons, caused by chemotherapy which damages the peripheral nerve fiber (Arıkan and Kurt, 2014). This adverse effect is characterized by a decrease in motor skills, sensory dysfunctions, loss in deep tendon reflexes, muscle weakness, and peripheral nerve involvement. The incidence rate of peripheral neuropathy varies, depending upon the varied chemotherapy protocols, drug dosages, and the duration of the post-treatment period. Peripheral neuropathy emerges as a common adverse effect of chemotherapeutic drugs such as taxanes, vinca alkaloids, platinum compounds, bortezomib and thalidomide (Miltenburg and Boogerd, 2014; Costa et al., 2015; Staff et al., 2017). As a result of a meta-analysis for fluorouracil/leucovorin/oksaliplatin, the chemotherapy protocols, the rate of peripheral neuropathy incidence was found to be 3.8–68% (Chen et al., 2010). In the meta-analysis study conducted by Seretny et al. (2014), the peripheral neuropathy prevalence was found to be 68.1% in the first month, 60.6% in the third month and 30% after the third month.

It is fair to say that peripheral neuropathy will affect more people due to the new cancer cases which are increasing daily, and due to the new chemotherapy treatments. Sensory, motor and autonomic symptoms are being observed as a result of peripheral neuropathy. These

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symptoms include pain, formication, low reflex levels, weakness, distortion in walking and balance, constipation, urinary retention, sexual dysfunction and so on (Arıkan and Kurt, 2014). Symptoms generally start at the finger tips and advance from the distal to proximal. Affected areas display stocking and glove distribution (Kannarkat et al., 2008; Tofthagen, 2010; Tofthagen et al., 2013). Patients suffer from paresthesia and weakness, and may sustain injuries due to a loss of balance; their daily lives are negatively affected (Tofthagen, 2010). It is fair to say that these symptoms which weaken the functional abilities of the patients also decrease the patients' quality of life. Mols et al. (2013) demonstrated in a study conducted with colorectal cancer patients that there was a negative relationship between the peripheral neuropathy and quality of life, and that peripheral neuropathy negatively affected the quality of life.

Therefore, these symptoms should be comprehensively addressed in order to effectively manage them (Binner et al., 2011; Lavoie Smith et al., 2011). In addition to sufficient knowledge and skills, valid and reliable measurement tools that can objectively evaluate a symptom are also needed for comprehensive evaluation. Studies in the literature demonstrate that various scales have been developed to evaluate chemotherapy-induced peripheral neuropathy (Chaudhry et al., 1994; Lavoie Smith et al., 2011; Tofthagen et al., 2011). In the systematic review study that was done, it was reported that there are 20 different measurement tools were used in the evaluation of the peripheral neuropathy resulting from chemotherapy (Haryani et al., 2017).

The European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire for Chemotherapy-Induced Peripheral Neuropathy is used in Turkey to evaluate chemotherapy-induced peripheral neuropathy (Postma et al., 2005; Ünsüz, 2015). The symptoms of peripheral neuropathy associated with chemotherapy and the effect of functional limitations that was caused by this problem on the life of patients are evaluated by this tool. The Chemotherapy-Induced Peripheral Neuropathy Assessment Tool (CIPNAT), unlike the EORTC QLQ-CIPN 20, demonstrates the status of negative effect on patients daily life activities together with the frequency, severity, and emotional distress levels of symptoms. That the CIPNAT is a measurement tool to be used in evaluation of neuropathy resulting from chemotherapy was reported in literature, and it is used for evaluation (Chu et al., 2015; Kim et al., 2015). It was reported that it can be used as a patient self report scale in evaluation of peripheral neuropathy resulting from oxaliplatin (Chu et al., 2015). The use of this measurement tool contributes to the detailed evaluation of patients in terms of peripheral neuropathy. Therefore, our study was designed to test the Turkish validity and reliability of the CIPNAT. We believe that, as a result of this validity and reliability study of the CIPNAT, patients will be examined in a more detailed manner, and this tool will be used in oncology nursing in Turkey. Moreover, when evaluations are performed with objective measurement tools, the results will provide a basis for studies to be conducted on the findings.

2. Methods

2.1. Study design and participants

This methodological study was conducted on the validity and reliability of the Turkish adaptation of the “Chemotherapy-Induced Peripheral Neuropathy Assessment Tool”. The data was derived from 327 patients receiving chemotherapy at the Outpatient Chemotherapy Units of two University Hospitals between June 2015 and January 2016. Of the 400 patient invited to participate in the study, 330 agreed to do so and returned the questionnaire, giving in a response rate of 82.5%. There patients did not fully complete their questionnaires. Thus, the study was carried out with a sample size of 327. In studies conducted according to the adequacy of the sample for factor analysis, it was evaluated as follows: 100 = poor, 200 = fair, 300 = good, 500 = very good, 1000 or more = excellent (MacCallum et al., 1999). A sample of 327 participants was sufficient for a confirmatory factor analysis of the CIPNAT.

The patients who were included in the study met the following criteria: receiving chemotherapy (taxanes and platinum group) causing neurotoxicity, receiving outpatient chemotherapy treatment, receiving at least one bout of chemotherapy treatment causing peripheral neurotoxicity, being older than 18 years, and being able to comprehend and speak. Patients with diabetes, dementia and a psychiatric diagnosis, and those who wished to leave the study were excluded.

For the Turkish adaptation study of CIPNAT, permissions were obtained from the author who developed the scale, chief physicians of the hospitals where the study was conducted and the Clinical Studies Committee of the Faculty of Medicine at Akdeniz University.

2.2. Data collection

The patients who meet the criteria for including in the sample were informed the subject concerning that the purpose of the research and personal information would be confidential. The study was conducted on a volunteer basis, and the principles of the Declaration of Helsinki were observed. Their verbal/written permissions were obtained. The data were obtained by researchers prior to treatment in a separate room in the way that prevent interaction in the outpatient units. Sociodemographic Data Form was filled by researchers. EORTC QLQ-CIPN 20 and CIPNAT were filled by patients. The questionnaire took about 30 min to complete. None of the study participants reported.

2.3. Instruments

Three tools were used to collect the data.

Sociodemographic Data Form: This is a form consisting of sixteen questions regarding patients' sociodemographic characteristics and the data related to their disease.

European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire for Chemotherapy-Induced Peripheral Neuropathy (EORTC QLQ-CIPN 20): This questionnaire, which has twenty items, was developed by Postma et al. (2005) to determine the peripheral neuropathy symptoms related to chemotherapy, the functional limitations caused by this problem, and the impact on patients' lives. This questionnaire has three sub-scales which are: a) sensory (formication, paresthesia, pain, imbalance while walking or standing, distinguishing the temperature and hearing), b) motor (cramps, writing, grasping small objects, muscle weakness) and c) autonomic (feeling dizzy after changing position, difficulty seeing, and erectile dysfunctions). Twenty items in the questionnaire were phrased according to the Likert scale, and the answers included None “1”, a Few “2”, Notably “3”, and Many “4”. High scores from these sections indicated more symptoms and problems, while low scores indicated fewer symptoms and problems. For all scales, the raw score is found by calculating the average of all subgroup items. $Raw\ score = RS = (I_1 + I_2 + \ldots + I_n)/n$ scale scores in all subscales are evaluated using the calculation method in the EORTC QLQ-C30 symptom scale, and the $\times 100$ formula is used to calculate the scale score (Postma et al., 2005; Ünsüz, 2015). The cronbach alpha values were 0.78, 0.85, −0.059 for the sensory, motor, and autonomic subscales in Turkish version of the EORTC QLQ-CIPN20, respectively (Ünsüz, 2015).

It is used as a practical assessment tool whose validity and reliability studies were completed in our country and other countries for evaluating peripheral neuropathy resulting from chemotherapy. It has also been used in assessment of the patients which are given chemotherapy drugs on account of the treatment of disease such as colorectal cancer that cause peripheral neuropathy (Mols et al., 2013; Kim et al., 2014; Ünsüz, 2015).

Chemotherapy-Induced Peripheral Neuropathy Assessment Tool: This scale was developed by Tofthagen et al. (2011) to evaluate chemotherapy-induced peripheral neuropathy. The scale consists of two

sections. The first section concerns nine symptoms; the severity of these symptoms, the possibility of an emotional problem occurring, and the incidence rate of these symptoms are evaluated. The first six questions in this section constitute the sensory symptoms, and the seventh, eighth and ninth questions constitute the subdimensions of motor symptoms. In the second section, fourteen (sensory and motor) activities were evaluated, including whether they were affected by the symptoms, and how they were affected by the symptoms. These affected activities consisted of fine motor activities and general activities. While the activities of dressing, writing, picking up objects and holding onto objects were included in the fine motor subdimension, other activities were evaluated as general activities.

The following items were included: Experiencing peripheral neuropathy symptom (1 = Yes, 2 = No), The severity of the symptom (1 = Not at all severe, 10 = Extremely severe), distressing. (emotionally upsetting) induced by the symptom (1 = Not at all distressing, 10 = Extremely distressing), Frequency of the symptom (1 = Never, 10 = Always), and Peripheral neuropathy symptoms limiting the activities (1 = Not at all interfering, 10 = Completely interfering). The presence (0–1), severity (0–10), incidence (0–10) of the symptom and emotional problems (0–10) induced by the symptom were evaluated with the first nine items. The total score to be obtained from the scale is between 0 and 279. High scores indicate severe symptoms, high rate of incidence, many emotional problems and limitations on daily life activities (Tofthagen et al., 2011).

2.4. Procedures

2.4.1. Language validity phase

Permission of Cindy Tofthagen was obtained by email so that the validity and reliability of the scale can be studied (Wednesday, December 17, 2014).

In this phase, three experts who were proficient in English and saw the patients in the oncology unit translated the scale to Turkish. The scale was arranged as a single text. Experts were consulted about their opinions beforehand. CIPNAT was evaluated by a Turkish language and literature expert for its proficiency in Turkish, and was edited in accordance with the recommendations. The scale text was translated to English by another person who dealt with the oncology patients and was proficient both in English and Turkish. The scale in English, which was created with the translation, was compared to the original items and evaluated for its similarity. The preliminary practice was performed with twenty patients, and the scale was finalized.

2.5. Statistical analysis

The data was evaluated using SPSS 21 (SPSS Inc., Chicago IL, USA) statistical software. statistics such as frequencies, percentages, means, and Standard deviations were used to describe patient characteristics.

2.5.1. Validity

A content validity index (CVI) was used in order to examine the validity. The exploratory factor analysis and the confirmatory factor analysis (CFA) were performed. The verification of the structure obtained with CFA was provided by AMOS 21.0. The concurrent validity study CIPNAT and EORTC QLQ-CIPN 20 were performed simultaneously, and the relationship between the subdimensions was evaluated.

2.5.2. Reliability

Cronbach's alpha coefficient and item-total correlations were calculated. Test retest reliability was also performed.

Table 1
Descriptive characteristics of patients.

Demographic Data	n	%
Sex		
Mean Age: Mean ± SD (min-max) = 56.81 ± 11.50 years (20.00–85.00)		
Female	175	53.5
Male	152	46.5
Marital Status		
Married	303	92.7
Single	24	7.3
Educational Status		
Literate	60	18.4
Graduate of elementary school	162	49.5
Graduate of high school	54	16.5
Bachelor's or master's degree	51	15.6
Working Status		
Yes	40	12.2
No	287	87.8
Cancer type		
Lung	72	22.0
Breast	88	26.9
Colorectal	41	12.5
Ovarian	38	11.6
Stomach	18	5.5
Liver	5	1.5
Pancreas	5	1.5
Prostate	6	1.8
Other (brain malignant neoplasm, tongue, maxillary, thyroid, parathyroid, larynx, nasopharynx, esophagus, bladder, cervix, endometrium, uterine, adeno sarcoma etc.)	54	16.5
Diagnosis Duration: Mean ± SD (min-max) = 14.62 ± 22.66 months (00.00–180.00)		
Cancer stage		
I	58	17.7
II	83	25.4
III	72	22.0
IV	114	34.9

SD = standard deviation.

3. Results

3.1. Participant characteristics

Patients' descriptive characteristics data are shown in Table 1. The mean age of the participants was 56.81 ± 11.50. Of the patients, 53.5% were females, 92.7% were married, almost half of them (49.5%) were elementary school graduates, and the majority of them (87.8%) were not working. Common diagnoses included breast (26.9%), lung (22.0%) and colorectal cancers (12.5%). The mean diagnosis duration for the patients was 14.62 ± 22.66 months, and the stage of illness of the 34.9% was stage IV.

The average score that the patients got for CIPNAT is 123.6 + 74.7 (Min:17; Max: 279).

3.2. Reliability

The reliability coefficient was calculated as 0.971 to determine the internal consistency for the entire scale. The total item correlation scores for each item ranged between 0.401 and 0.906. Factor loadings ranged between 0.758 and 0.897 in the sensory symptoms subdimension in the symptom experience section (Table 2). The reliability coefficient of this subdimension is 0.945. Factor loadings ranged between 0.801 and 0.860, and the reliability coefficient was 0.809 in the motor symptoms subdimension. (see Table 3).

Factor loadings ranged between 0.656 and 0.948, and the reliability coefficient was 0.954 in the fine motor activities subdimension in the section where the impact of symptoms on the activities were evaluated. Factor loadings ranged between 0.498 and 0.843, and the reliability coefficient was 0.836 in the general activities subdimension.

Table 2
Items' factor loadings, total ıtem correlations and cronbach's alpha values when the ıtem is removed.

Items	Factor Loadings	Total Item Correlations	Cronbach's Alpha Values When the Item is Removed
Numbness in the hands	0.876	0.783	0.892
Severity of numbness hands	0.845	0.817	0.968
Distress of numbness hands	0.805	0.775	0.968
How often do you have numbness hands	0.810	0.781	0.968
Numbness in the feet	0.895	0.802	0.891
Severity of numbness feet	0.856	0.827	0.968
Distress of numbness feet	0.823	0.792	0.968
Frequency of numbness feet	0.822	0.794	0.968
Tingling in the hands	0.874	0.785	0.892
Severity of tingling hands	0.844	0.815	0.968
Distress of tingling hands	0.814	0.784	0.968
Frequency of tingling hands	0.800	0.771	0.968
Tingling in the feet	0.873	0.787	0.892
Severity of tingling feet	0.858	0.831	0.968
Distress of tingling feet	0.810	0.778	0.968
Frequency of tingling feet	0.820	0.791	0.968
Cold sensitivity	0.897	0.833	0.889
Severity of cold sensitivity	0.826	0.804	0.968
Distress of cold sensitivity	0.799	0.775	0.968
How often do you have cold sensitivity	0.830	0.810	0.968
Nerve pain	0.758	0.689	0.899
Severity of nerve pain	0.647	0.626	0.969
Distress of nerve pain	0.650	0.625	0.969
Frequency of nerve pain	0.647	0.624	0.969
Muscle or joint aches	0.812	0.571	0.907
Severity of muscle or joint aches	0.696	0.682	0.969
Distress of muscle or joint aches	0.695	0.680	0.969
Frequency of muscle or joint aches	0.673	0.658	0.969
Weakness in the arms or legs	0.860	0.401	0.920
Severity of muscle weakness	0.587	0.583	0.969
Distress of muscle weakness	0.574	0.563	0.970
Frequency of muscle weakness	0.582	0.578	0.969
Loss of balance	0.801	0.599	0.905
Severity of loss of balance	0.687	0.672	0.969
Distress of loss of balance	0.698	0.682	0.969
Frequency of loss of balance	0.693	0.678	0.969
Interference with dressing	0.864	0.812	0.950
Interference with walking	0.727	0.810	0.950
Interference with picking up objects	0.922	0.906	0.944
Interference with holding onto objects	0.948	0.900	0.944
Interference with driving	0.498	0.470	0.835
Interference with working	0.691	0.777	0.952
Interference with hobbies	0.672	0.691	0.792
Interference with exercise	0.656	0.781	0.951
Interference with sexual activity	0.616	0.551	0.824
Interference with sleep	0.676	0.647	0.802
Interference with relationships	0.843	0.660	0.800
Interference with writing	0.880	0.863	0.947
Interference with chores	0.729	0.819	0.949
Interference with enjoyment of life	0.768	0.660	0.800

Table 3
DFA Acceptable goodness of fit and calculated fit indices.

Acceptable Fit Indices	Calculated Fit Indices
$\chi 2/sd < 5$	2.749
GFI > 0.90	0.958
AGFI > 0.90	0.924
CFI > 0.90	0.981
RMSEA < 0.08	0.073
RMR < 0.08	0.009

Another practice was performed with forty patients for the retest reliability two weeks later. Test retest scores were $r = 0.89$, $p < 0.0.001$ for CIPNAT scores, $r = 0.92$, $p < 0.0.001$ for experiencing the symptom and $r = 0.90$, $p < 0.0.001$ for the impact on the activities. These findings indicate that the reliability is high.

3.3. Validity

Seven experts (two oncology nurses, one medical oncologist, one neurology doctor and three instructors in the Department of Nursing) were consulted about their opinions on content validity. The Content Validity Index (CVI) was used to evaluate the experts' opinions. The following procedure was used to evaluate the index: “1- not appropriate, 2-slightly appropriate (items/statements should be more appropriate), 3-very appropriate (appropriate, but small changes are required), 4-most appropriate”. Within this respect, experts were asked to rate each item with various degrees, ranging between one and four. The CVI was calculated (Polit and Beck, 2006). The CVI was calculated as 0.96 for this study.

The exploratory factor analysis was performed for ensuring CIPNAT construct validity. The Kaiser-Meyer Olkin (KMO) coefficient and the Barlett Sphericity Test were used in order to determine whether the number of the sampling was sufficient for the factor analysis. In this study, KMO was 0.896, and Bartlett's X^2 was 2308.388 ($p < 0.05$). Factor loadings for CIPNAT items were 0.498 and 0.948 (Table 2).

Table 4
The correlation between CIPNAT and EORTC QLQ-CIPN 20 scores.

		CIPN20 (Sensory Subdimension)	CIPN20 (Motor Subdimension)	CIPN20 (Autonomic Subdimension)
CIPNAT (Emotional Symptoms)	*r*	0.146	−0.041	−0.045
	p	0.068	0.612	0.575
	n	157	157	157
CIPNAT (Motor Symptoms)	*r*	0.376**	0.245**	0.208**
	p	0.000	0.002	0.009
	n	157	157	157
CIPNAT (Symptoms)	*r*	0.851**	0.544**	0.558**
	p	0.000	0.000	0.000
	n	157	157	157
CIPNAT (Fine Motor)	*r*	0.398**	0.456**	0.726**
	p	0.000	0.000	0.000
	n	157	157	157
CIPNAT (General activities)	*r*	0.429**	0.506**	0.665**
	p	0.000	0.000	0.000
	n	157	157	157

**p < 0.01: A significant relationship exists.

The confirmatory factor analysis aims to examine the confirmation degree of a predetermined or designed construct with the data. Therefore, many fit indices are used. The most common ones are Chi-Square Goodness, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), Root Mean Square Residual (RMR) and Root Mean Square Error of Approximation (RMSEA) (Cole, 1987; Sümer, 2000). Fit indices were found as $\chi 2/sd = 2.74$, GFI = 0.95, AGFI = 0.92, CFI = 0.98, RMSEA = 0.07, and RMR = 0.009 in this study.

The concurrent validity was tested, too. This validity method was used for determining the existence of a form developed beforehand. In addition, the correlation level between the scales is also examined (Esin, 2014). As displayed in Table 4, a relationship was ensured between the subdimensions of the scale.

4. Discussion

Due to the limited numbers of the studies in which CIPNAT was used, discussion of the data was performed via the findings of validity and reliability. Validity and reliability are the main characteristics of a measurement tool. Reliability is the capability of a measurement tool to provide sensitive, consistent and decisive results. Internal consistency reliability is considered for the evaluation of the reliability. The internal consistency should be proved. It should be proved that all sub dimensions of the scale measure the same characteristics. Therefore, as a result of the evaluation for the internal consistency reliability, Cronbach's alpha coefficient was found highly reliable for CIPNAT in this study. In a study conducted by Tofthagen et al. (2011), this coefficient was found to be 0.95 (Tofthagen et al., 2011). Various acceptable values were attributed to Cronbach's alpha value, and 0.75–0.95 indicated the acceptable value range (Tavakol and Dennik, 2011). Also, total item correlations varied between 0.40 and 0.90 in this study. Whereas it was determined to be between 0.38 and 0.70 in the study in which the scale was developed (Tofthagen et al., 2011).These results demonstrated that the items had good selectivity, and that these items could measure the characteristics which were targeted for evaluation.

For evaluation of reliability, test-retest evaluates the capability of a measurement tool to provide consistent results, regardless of the practices, and to remain consistent throughout the study (Gözüm and Aksayan, 2003). As a result of the CIPNAT practice, test-retest reliability of the scale was found to be high. In a study conducted by Tofthagen et al. (2011) who developed the scale, test-retest correlations were found to be high too ($r = 0.92$, $p < 0.001$).

Validity can be described as how a measurement tool serves a purpose, and to what degree (Akgül, 1997). In this study, where the validity of CIPNAT was evaluated, language equivalency, content validity, construct validity and concurrent validity were used. Language equivalency covers the translations (from English to Turkish and Turkish to English), and evaluation by a language expert. The finalized scale was evaluated by the experts, and the CVI was calculated. The CVI was ensured to be significant with the Total Validity Rates of the items at (alpha sign) = 0.05 level, and was obtained from the last form. This value is not compared to a statistical criterion. Instead, 0.80 is accepted as the criterion (Yurdugül, 2005). It is fair to say that the content validity was highly acceptable in this study. Similary in a study conducted by Tofthagen et al. (2011), the developers of the scale, the CVI was calculated as highly acceptable.

Factor analysis was used in construct validity. The Kaiser-Meyer Olkin (KMO) coefficient and Barlett Sphericity Test were used for determining whether the number of the sampling was sufficient for the factor analysis. If the value is found to be lower than 0.50 as a result of the Kaiser-Meyer-Olkin test, the factor analysis cannot be maintained (Çokluk et al., 2012). In this study, The number of the sampling was found to be exploratory and sufficient for factor analyses in this study. The factor load value is a coefficient that describes the relation of the items with the factors. It is not desirable that the factor loads in the scale items are below 0.30 (Büyüköztürk, 2002; Harrington, 2009). It is seen that the factor loads in the items of scale was found desired range.

Many fit indices were used to evaluate the validity in DFA. The most common ones are Chi-Square Goodness (χ^2), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), and Root Mean Square Error of Approximation (RMSEA) (Cole, 1987; Sümer, 2000). In this study, goodness of fit statistics calculated with DFA and CIPNAT's structure are considered to conform to the data. Additionally, EORTC QLQ-CIPN 20 was used in this study as a valid and similar instrument for concurrent validity. Tofthagen et al. (2011) used FACT/GOG-Ntx when testing the convergent and discriminant validity (Tofthagen et al., 2011). The existence of different measurement tools in the validity studies become importance in terms of the studies (Esin, 2014).

5. Conclusion

CIPNAT is a sufficient, valid and reliable tool that can be used for the comprehensive evaluation of peripheral neuropathy in Turkish cancer patients. The fact that there is a different evaluation tool to be used for the evaluation of chemotherapy-induced peripheral neuropathy ensures more choices. A complete and comprehensive evaluation can be performed when the presence of symptoms is determined with objective measurement tools. Explaining a symptom in a detailed way will be instructive in treatment planning, and in caring for patients in an individualized manner. In addition, the findings of this study should ensure that the measurement tool is used in conducting the studies related to symptom control in peripheral neuropathy.

Note

We received statistical counseling from Statistical Workshop (Oğuzhan Çicek).

Conflict of interest

None.

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