Ergoterapi ve Rehabilitasyon Dergisi, 11(3), 2023, 123-132

Research Article

# Reliability and Validity of the Turkish Version of the Gynecologic Cancer Lymphedema Questionnaire-7 for Individuals with Gynecologic Cancer

Jinekolojik Kanserli Bireylerde Jinekolojik Kanser Lenfödem Anketi-7'nin Türkçe Versiyonunun Güvenirlik ve Geçerliğinin Araştırılması

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**ABSTRACT**

**Purpose:** The aim of this study was to investigate the reliability and validity of the Turkish version of the Gynecologic Cancer Lymphedema Questionnaire-7 (GCLQ-7) for the differentiation of patients with and without lymphedema in the lower extremities (LELE) in individuals with gynecological cancer. **Material and Methods:** The questionnaire was administered to a lymphedema group of 70 patients with unilateral LELE, mean age of 58.84±11.05 years, who were undergoing gynecologic cancer surgery, and a Latent group of 27 patients with a mean age of 93±10.05 years, who were undergoing gynecologic cancer surgery without LELE. **Results:** In the reliability analysis of the GCLQ-7, the Cronbach alpha values of GCLQ-7 were found to be 0.778, 0.769, 0.841, 0.785, 0.769, 0.848 and 0.871, respectively. Criterion validity was used in the validity analysis of the scale, and the results showed differences between the circumference measurements and the total score of the scale, in the LE group, in respect of the lower extremity measured at 5 cm (r=0.277), 10 cm (r=0.293), 15 cm (r=0.291), and 20 cm above the medial malleolus. **Discussion:** The GCLQ-7 was found to be a safe and valid scale for the differentiation of patients with and without LELE in a Turkish population.

**Keywords:** Gynecologic Cancer; Lymphedema; Validity.

**ÖZ**

**Amaç:** Bu çalışmanın amacı; jinekolojik kanserli bireylerde, Jinekolojik Kanser Lenfödem Anketi-7'nin (JKLA-7), Türkçe versiyonunun alt ekstremite lenfödemi (AELÖ) olan ve olmayanları ayırt etmede güvenirlik ve geçerliğini araştırmaktır. **Gereç ve Yöntem:** Çalışmada, jinekolojik kanser cerrahisi geçiren, unilateral AELÖ olan, yaş ortalamaları 58,84±11,05 yıl olan 70 kişi, LÖ grubuna ve jinekolojik kanser cerrahisi geçiren, AELÖ bulgusu olmayan , yaş ortalamaları 57,93±10,05 yıl olan 27 kişi ise Latent gruba katıldı. LÖ için çevre ölçümü değerlendirmeleri yapıldı. JKLA-7, test tekrar test güvenirliği Sınıf içi Korelasyon Katsayısı (Intra Class Corelation (ICC)) ile, iç tutarlılık güvenirliği Cronbach alfa ile anket geçerliği ise kriter geçerlik yöntemleri ile hesaplandı. **Sonuçlar:** JKLA-7'nin güvenirlik analizinde JKLA-7'nin cronbach's alpha değerleri sırasıyla 0,778, 0,769, 0,841, 0,785, 0,769, 0,848 ve 0,871 olarak bulundu. Ölçeğin geçerlik analizinde kriter geçerlik kullanıldı. Ölçeğin geçerliği için yapılan analizler sonucu çevre ölçümleri ile ölçeğin toplam puanı arasında, LÖ olan grupta, alt ekstremite medial malleol 5 cm üzeri (r=0,277), 10 cm üzeri (r=0,293), 15 cm üzeri (r=0,291), 20 cm üzeri (r=0,293) ve 25 cm üzeri (r=0,244) değerleri arasında istatistiksel olarak anlamlı (p<0,05) pozitif yönde ilişkiler olduğu görüldü. **Tartışma:** JKLA-7'nin Türkçe versiyonunun, Türk kadınlarında AELÖ'i olan ve AELÖ'i olmayanları ayırt etmede güvenli ve geçerli bir ölçek olduğu belirlendi.

**Anahtar Kelimeler:** Jinekolojik Kanser; Lenfödem; Geçerlilik.

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Geliş Tarihi (Received): 20.06.2023; Kabul Tarihi (Accepted): 23.08.2023

Lymphedema (LE) is a chronic and progressive condition that occurs because of abnormal accumulation of protein-rich fluid in the interstitial space due to affected lymphatic drainage (Thompson, Gaitatzis, Janse de Jonge et al., 2021). Secondary lymphedema may occur following trauma, cancer-related surgery and adjuvant treatments, or structural destruction of the lymphatic system such as infection (Chaput, Ibrahim and Towers, 2020). Cancer is accepted as a global public health problem, and lymphedema is the most important complication after cancer treatment (Deura, Shimada, Hirashita et al., 2015; Devoogdt, Geraerts, Van Kampen et al., 2018). The incidence of cancer-related lymphedema can vary between 5% and 83% depending on the localization of cancer, differences in surgical treatment methods, and changes in lymphedema diagnostic methods (Chaput, Ibrahim and Towers, 2020; Hayes, Janda, Ward et al., 2017). Gynecological cancers can be encountered as cervical cancer, ovarian cancer, endometrial cancer, and vulvar/vaginal cancer (Lim, Lee, Joo et al., 2014). In gynecological cancer surgery, pelvic lymph node dissection is usually performed for staging and/or to reduce the tumor burden (Bae, Lim, Lee et al., 2016). LE, can cause a feeling of heaviness, tightness, stiffness in the extremity, infection. Due to pain and decreased mobility the patient's quality of life decreases (Shi, Lu, Fu et al., 2016). It is recommended to start LE treatment as early as possible before irreversible changes occur (Cemal, Jewell, Albornoz et al., 2013). Therefore, early detection of LE is key to both prognosis and control of treatment.

The Gynecological Cancer Lymphedema Questionnaire (GCLQ) was developed by Carter et al. as a scale to evaluate symptoms (Carter, Raviv, Appollo et al., 2010). The GCLQ is a simple 20-item diagnostic scale that aims to investigate whether LE is present in the lower extremities without posing any risk to the patient. The GCLQ-K is the Korean version of the scale, on which the 7-item GCLQ-7 version was then developed (Lim, Lee, Joo et al., 2014; Kim et al., 2017). In 2020, the GCLQ scale was adapted to the Turkish population by Abakay et al. and was found to be valid and reliable (Abakay, Abdülrezzak and Akbayrak, 2022). A simplified scan tool may be required for early diagnosis and effective follow-up tests and a simpler applicability than GCLQ was conducted. The aim of this study was to investigate the validity and reliability in the Turkish population of the shorter GCLQ-7 scale, which may take less time to administer.

## MATERIAL AND METHODS

*Participants*

The study included 70 patients with lymphedema and 27 patients without lymphedema who presented at Hacettepe University Faculty of Physical Therapy and Rehabilitation, Pelvic Health and Women's Health Physiotherapy and Rehabilitation Unit and had undergone gynecological cancer surgery. A record was made which included all the patients' detailed medical histories, age, weight, height, education level, lymphedema severity, affected extremity, and cancer type.

The study inclusion criteria were to be aged over 18 years, to have undergone gynecological cancer surgery, to have unilateral lower extremity lymphedema, completed chemotherapy and/or radiotherapy treatments, and a level of literacy allowing the scale to be understood and completed. Patients were excluded from the study if they did not wish to voluntarily participate, had bilateral lower extremity lymphedema, systemic edema, any neurological disease, acute inflammation, metastasis, or any mental problems that would prevent cooperation and understanding (Figure 1).

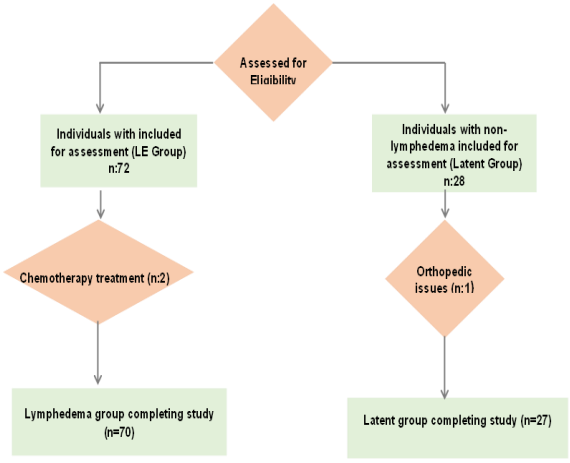


***Figure 1.*** Patient Flow Chart

Approval for this study was obtained from the Non-Interventional Clinical Research Ethics Committee of Hacettepe University (decision no: GO 21/94, dated: 04.05.2021). Informed Consent was provided by all the study participants in compliance with the Declaration of Helsinki.

*Data Collection Tools*

A record was made of physical data (age, height, body weight, BMI) and demographic data (educational status, marital status, occupation,

cancer diagnosis, etc.). The lower extremity circumference measurements of the individuals were taken bilaterally. LE symptoms were evaluated with the GCLQ-7.

*Circumference Measurements*: With the patient positioned supine, the circumference measurements were made on both lower extremities, advancing at 5 cm intervals from the medial malleolus to the inguinal region. The difference between both extremities was recorded in centimeter. Those with a difference of over 2 centimeters between the lower extremity circumference measurements were included in the LE group, and those with a difference of below 2 centimeters between the lower extremity circumference measurements were included in the Latent group. Two centimeters or above difference between the affected and unaffected leg in the same reference point was chosen as the diagnostic criteria for LELE. For latent group, same conditions were valid with the lymphedema group except for having LELE (difference less than 2 centimeters in regard to leg circumference was accepted as grade 0 (Bakar, Tuğral and Uyetürk, 2018).

*Gynecological Cancer Lymphedema Scale-7 (GCLQ-7):* The GCLQ was developed as a symptom scale to evaluate lower extremity LE in patients who developed LE after gynecological cancer surgery or who were at risk of developing LE. The scale includes physical functioning (items 1-6), general edema (items 8-9, 20), heaviness (items 14), extremity edema (items 18-19), infection (items 10-11, 13), pain (item 17) and numbness (items 7, 12, 15-16). GCLQ-7 was formed by taking one item from each symptom cluster of GCLQ (items 2, 8, 10, 12, 14, 17, 19. items).

The validity of the scale has been studied in Türkiye and Korea. The short form of the Korean version, GCLQ-7, has a Cronbach α value of 0.699 (Kim et al., 2017). It evaluates the current situation as well as the past four weeks. The questions are answered as yes (1) or no (0) and are scored accordingly to give a total score ranging from 0 to 7 (Kim et al., 2017).

*Translation*: The GCLQ was adapted to Turkish by Abakay et al. (Abakay, Abdulrezzak and Akbayrak, 2022). The GCLQ-7 scale consists of 7 questions from 7 symptom clusters in the GCLQ. Permission was obtained via e-mail from Se Ik Kim for the short form of the original questionnaire.

In this study, the Turkish version of the short version of the scale was created by translating 7 questions in Turkish using the GCLQ translation with the permission of Abakay et al.

The presence and severity of lymphedema of all the study participants were evaluated objectively with measurements. The circumference was measured in the supine position, bilaterally, at 5 cm intervals from the foot metatarsophalangeal joint circumference and from the medial malleolus to the inguinal region. The differences between both extremities were recorded. According to the results of the circumference measurement, lymphedema was defined as a difference of more than 2 centimeters between the affected extremities, and the participants with a difference of less than 2 centimeters between the extremities were included in the Latent group (Bakar, Tuğral and Uyetürk, 2018).

All the study participants completed the GCLQ-7 face to face. To determine the reliability of the scale, it was administered again to some of the participants with lymphedema after an interval of 7 days (n=30).

*Statistical Analys*

All statistical analyses were performed using SPSS 25.0 (IBM SPSS Statistics 25 software (Armonk, NY: IBM Corp.)). Continuous variables were summarized by the mean ± standard deviation, median (IQR: 25th-75th percentiles) and minimum-maximum values. Kolmogorov Smirnov and Shapiro Wilk tests were used for determination of normal distribution. For independent groups comparisons, we used independent samples t test when parametric test assumptions were met, Mann Whitney U tests were used when parametric test assumptions were not met. Chi Square test was used for categorical variables. The Receiver Operating Characteristic (ROC) analysis method was used to determine the diagnosis performance of the scale. Youden Index value was used to determine the most appropriate cut-off point within the ROC analysis. Sensitivity and Specificity values were used to analyze the diagnostic performance of the scale. To examine the construct validity of the scale we used Spearman Correlation Coefficient. For Spearman correlation coefficient; r=0.00 (no corelation), r=0.01-0.29 (low corelation), r=0.30-0.70 (moderate corelation), r=0.71-0.99 (high correlation) and r=1.00 (excellent relationship) reference ranges were taken. Internal consistency of the scale was examined with “Cronbach's α coefficient”, “Scale Mean If Item Deleted”, “Corrected Item – Total Correlations” and “Cronbach's Alpha If Item Deleted” approaches for all items of the scale. A Cronbach’s α value of “α ≥0.70” was considered as reliable. Statistical significance was determined as $p \leq 0.05$.

**RESULTS**

The anthropometric data were examined and there was seen to be no statistically significant difference between the groups in respect of age and height (p>0.05). The body weight and BMI values showed statistically significant differences between the groups with and without LE (p<0.05). In both parameters, the values of the patients in the LE group were found to be significantly higher than those of the patients in the Latent group (p<0.05) (Table 1).

**Table 1.** Demographic features of cases

| | Latent group (n:27) | | | LE group (n:70) | | | |
|---|---|---|---|---|---|---|---|
| | **Mean ± SD** | **Med (IQR)** | **Min - Maks** | **Mean ± SD** | **Med (IQR)** | **Min - Maks** | **p** |
| **Age (year)** | 57.93 ± 10.05 | 59 (49 - 62) | 39 - 79 | 58.84 ± 11.05 | 60 (52 - 66) | 34 – 84 | 0.708 (t= -0.375) |
| **Height (cm)** | 158.7 ± 4.45 | 160 (155 -162) | 150 - 166 | 160.51 ± 5.57 | 160 (156.75 - 165) | 147 - 170 | 0.134 (t=-1.511) |
| **Weight (kg)** | 77.07 ± 13.94 | 76 (69 -85) | 47 - 104 | 86.79 ± 13.72 | 85 (79 - 94) | 50 – 135 | **0.002*** (t=-3.111) |
| **BMI (Kg\m$^{2)}$** | 30.65 ± 5.89 | 29.14 (26.67 - 33.3) | 19.56 - 46.22 | 33.74 ± 5.45 | 33.13 (30.16 - 36.54) | 20.81 - 49.59 | **0.016*** (t=-2.447) |

**p<0.05 statistically significant, SD: Standard deviation, Med (min – max), Median (minimum – maximum values), t: Independent samples t test, LE: Lymphedema, BMI: Body Mass Index*

The physical and clinical characteristics of the cases, the severity of LE, and the distribution by gynecological cancer type are shown in Table 2. It was observed that the most common cases were ovarian cancer (70.4%). The severity of LE was evaluated as mild (n=5), moderate (n=21), and severe (n=44), respectively.

**Table 2.** Physical and clinical features of cases

| | | **Latent group (n:27)** | **LE group (n:70)** | **Total** | **p** |
|---|---|---|---|---|---|
| **Educational status** | Illiterate | 7 (%25.9) | 12 (%17.1) | 19 (%19.6) | 0.34 ($\chi^2$=4.523) |
| | Primary school | 9 (%33.3) | 39 (%55.7) | 48 (%49.5) | |
| | Middle school | 4 (%14.8) | 8 (%11.4) | 12 (%12.4) | |
| | High school | 4 (%14.8) | 8 (%11.4) | 12 (%12.4) | |
| | Univercity | 3 (%11.1) | 3 (%4.3) | 6 (%6.2) | |
| **Marital status** | Single | 4 (%14.8) | 10 (%14.3) | 14 (%14.4) | 1 |
| | Married | 23 (%85.2) | 60 (%85.7) | 83 (%85.6) | |
| **Types of cancer** | | | | | |
| **Endometrial Cancer** | No | 13 (%48.1) | 32 (%45.7) | 45 (%46.4) | 0.829 ($\chi^2$=0.046) |
| | Yes | 14 (%51.9) | 38 (%54.3) | 52 (%53.6) | |
| **Cervical Cancer** | No | 23 (%85.2) | 46 (%65.7) | 69 (%71.1) | 0.058 ($\chi^2$=3.597) |
| | Yes | 4 (%14.8) | 24 (%34.3) | 28 (%28.9) | |
| **Ovarian Cancer** | No | 8 (%29.6) | 34 (%48.6) | 42 (%43.3) | 0.092 ($\chi^2$=2.848) |
| | Yes | 19 (%70.4) | 36 (%51.4) | 55 (%56.7) | |
| **Lymphedema severity** | Mild | (%0) | 5 (%7.1) | 5 (%7.1) | - |
| | Moderate | (%0) | 21 (%30) | 21 (%30) | |
| | Severe | (%0) | 44 (%62.9) | 44 (%62.9) | |

**p<0.05 statistically significant, $\chi^2$: Chi Square test, n: number of people, .00: None*

A statistically significant difference was found between the groups with and without LE in all lower extremity measurements (p<0.05). At all the levels measured, the values were found to be significantly higher in the LE group than in the Latent group (p<0.05) (Table 3).

**Table 3.** Comparison of lower extremity circumference measurement values

| | Latent group (n:27) | | | LE Group(n:70) | | | |
|---|---|---|---|---|---|---|---|
| | **Mean± SD** | **Med (IQR)** | **Min – Max** | **Mean ± SD** | **Med (IQR)** | **Min - Max** | **p** |
| **Right medial malleol** | 22.15 ± 2.39 | 21.5 (20.3 - 24.3) | 18.8 - 27.4 | 26.67 ± 5.48 | 25.3(22.63-29.63) | 18.5 - 48.9 | **0.0001*** (z=4.331) |
| **Left medial malleol** | 22.29 ± 2.67 | 21.8 (20 - 23.9) | 18.2 - 28.2 | 27.41 ± 5.85 | 25.2 (23.05 - 30.9) | 20.4 - 51.9 | **0.0001*** (z=4.593) |
| **Right 5cm** | 23.86± 2.82 | 22.7 (21.7 - 26.3) | 19.5 - 28.7 | 29.27 ± 6.61 | 27.8 (24.93 - 31.8) | 20.2 - 54.3 | **0.0001*** (z=-4.38) |
| **Left 5cm** | 24± 2.92 | 23.3 (22 - 26.2) | 19.8 - 29.9 | 30.28 ± 7.67 | 27.7 (25.2 - 34.7) | 21.4 - 60.9 | **0.0001*** (z=4.589) |
| **Right 10cm** | 28.75 ± 3.84 | 29.1 (25.7 - 31.3) | 22.7 - 37.8 | 34.47 ± 8.05 | 31.7 (29.15 - 38.6) | 23.3 - 64.4 | **0.0001*** (z=3.562) |
| **Left 10cm** | 29.33 ± 4.41 | 29.6 (25.6 - 31.6) | 23.7 - 40.1 | 35.2 ± 8.28 | 32.65 (29.2 - 38.9) | 24.7 - 65.7 | **0.0001*** (z=3.695) |
| **Right 15cm** | 33.24 ± 4.48 | 34.5 (29.4 - 36.2) | 26.3 - 42.9 | 39.31 ± 8.05 | 37.2 (33.6 - 43.78) | 26.5 - 64.7 | **0.0001*** (z=3.526) |
| **Left 15cm** | 33.68 ± 4.24 | 35 (30.1 - 35.9) | 27.4 - 42.7 | 39.94 ± 8.24 | 37.5 (34.4 - 43.43) | 28.6 - 65.6 | **0.0001*** (z=3.775) |
| **Right 20cm** | 36.23 ± 4.76 | 36.1 (31.9 - 39.4) | 28.5 - 47.5 | 42.5 ± 8.21 | 39.9(36.85-45.65) | 28.5 - 67.8 | **0.0001*** (z=3.647) |
| **Left 20cm** | 36.58 ± 4.92 | 36.9 (32.4 - 39.2) | 28.3 - 47.7 | 43.06 ± 8.05 | 41.15(37.78-45.5) | 30.4 - 67.2 | **0.0001*** (z=3.812) |
| **Right 25cm** | 36.43 ± 5.09 | 36.2 (32.6 - 40) | 27.7 - 47.3 | 43.09 ± 8.13 | 41.05(37.48-47.4) | 29.3 - 68.5 | **0.0001*** (z=3.953) |
| **Left 25cm** | 36.59 ± 4.89 | 37.2 (32.9 - 40.2) | 28.1 - 47.3 | 43.57 ± 8.1 | 41.45(37.78-46.73) | 31.2 - 68.9 | **0.0001*** (z=4.166) |
| **Right 30cm** | 36.82 ± 4.14 | 35.3 (34.4 - 40) | 31 - 44.9 | 42.9 ± 8.26 | 40.65(38.13-46.58) | 31.7 - 73.2 | **0.0001*** (z=3.808) |
| **Left 30cm** | 36.84 ± 4.28 | 35.8 (34.4 - 39.3) | 30.9 - 45.9 | 43.54 ± 8.59 | 41.6 (37.28 - 46) | 33.2 - 77.4 | **0.0001*** (z=-4.23) |
| **Right 35cm** | 40.09 ± 4.76 | 39.5 (37.2 - 43) | 33.2 - 51.3 | 47.36 ± 10.06 | 43.45(40.65- 52.5) | 34.8 - 81.8 | **0.0001*** (z=3.675) |
| **Left 35cm** | 40.2 ± 4.79 | 39.1 (37.9 - 42.3) | 32.5 - 51.7 | 46.95 ± 8.68 | 44.55(41.75-50.15) | 36.3 - 82.6 | **0.0001*** (z=3.936) |
| **Right 40cm** | 43.31 ± 5.51 | 42.4 (39.7 - 46.7) | 35.4 - 55.1 | 51.29 ± 9.63 | 49.2 (44.4 - 57.18) | 37.3 - 84.2 | **0.0001*** (z=4.093) |
| **Left 40cm** | 43.39 ± 5.53 | 42.3 (40.2 - 46.4) | 34.7 – 56 | 50.93 ± 8.92 | 49.05(44.43-54.25) | 38.6 - 85.5 | **0.0001*** (z=4.266) |
| **Right 45cm** | 46.41 ± 5.79 | 45.8 (42.5 - 50) | 37.3 - 58.6 | 55.08 ± 9.69 | 52.9 (48.2 - 61.68) | 41.5 - 84.8 | **0.0001*** (z=4.154) |
| **Left 45cm** | 46.77 ± 5.77 | 45.6 (42.8 - 50) | 38.2 - 60.1 | 55.23 ± 9.29 | 53.2 (48.6 - 58.5) | 41.3 - 85.9 | **0.0001*** (z=4.371) |
| **Right 50cm** | 50.2 ± 6.89 | 49.3 (45 - 54.9) | 39.2 - 64.7 | 58.79 ± 9.26 | 57.3(52.68- 64.25) | 44.7 - 87.3 | **0.0001*** (z=-4.11) |
| **Left 50cm** | 50.52 ± 6.74 | 49.4(45.2- 55.5) | 40.1 - 64.3 | 59.17 ± 8.96 | 58.15(52.98-62.33) | 43.2 - 88.8 | **0.0001*** (z=4.283) |
| **Right 55cm** | 53.94 ± 7.72 | 54.2(49.4- 57.7) | 41.4 - 69.4 | 62.67 ± 9.3 | 60.5 (56 - 67.63) | 45.7 - 89.3 | **0.0001*** (z=3.973) |
| **Left 55cm** | 54.76 ± 8.08 | 54.3(48.9- 60.1) | 41.9 - 70.6 | 62.8 ± 9.12 | 61.4 (56 - 66.4) | 46.1 - 90.6 | **0.0001*** (z=3.707) |
| **Right 60cm** | 57.62 ± 7.65 | 57.6(53.5- 63.3) | 43.3 - 70.8 | 66.99 ± 9.51 | 65.35(60.58-1.7) | 50 - 100.7 | **0.0001*** (t=4.577) |

**p<0.05 statistically significant, SD: Standard Deviation, Med (min – max), Median (minimum – maximum values), z: Mann Whitney U test, t: Independent samples t test*

The Cronbach alpha values for physical function, general edema, infection, numbness, extremity edema, heaviness, and pain items were 0.778, 0.769, 0.841, 0.785, 0.769, 0.848, and 0.871, respectively. The overall Cronbach alpha value for 7 items was found to be 0.835 (Table 4).

**Table 4.** Item reliability of the GCLQ-7

| | **Scale Mean If Item Deleted** | **Corrected Item – Total Correlations** | **Cronbach's Alpha If Item Deleted** |
|---|---|---|---|
| **Physical functioning (Limited movement of your knee)** | 3.3711 | 0.787 | 0.778 |
| **Swelling-general (Experienced swelling)** | 3.2784 | 0.856 | 0.769 |
| **Infection related (Experienced redness)** | 3.7010 | 0.396 | 0.841 |
| **Numbness (Experienced firmness/tightness)** | 3.2784 | 0.757 | 0.785 |
| **Swelling-limb (Experienced groin swelling)** | 3.2784 | 0.856 | 0.769 |
| **Heaviness (Experienced heaviness)** | 3.3711 | 0.363 | 0.848 |
| **Aching (Experienced aching)** | 3.6598 | 0.191 | 0.871 |

The Cronbach alpha values were examined when items were deleted and all items were found to be reliable. In general, the Cronbach alpha values of all the items were found to be high. In the re-test of the scale after 1 week, consistency was found to be high in items 1, 2, 4 and 5 (Physical functioning, Swelling-general, Swelling-limb, Numbness), and low in items 3, 6, and 7 (Infection related, Heaviness, Aching). The concordance values of the GCLQ-7 items are shown in Table 5.

**Table 5.** Change status in items of GCLQ-7 over time.

| | **Consistency on No Answers** | **Consistency on Yes Answers** | **Total Consistency** |
|---|---|---|---|
| **Physical functioning (Limited movement of your knee)** | 0 (%0) | 25 (%83.3) | 25 (%83.3) |
| **Swelling-general (Experienced swelling)** | 0 (%0) | 30 (%100) | 30 (%100) |
| **Infection related (Experienced redness)** | 7 (%23.3) | 5 (%16.7) | 12 (%40) |
| **Numbness (Experienced firmness/tightness)** | 0 (%0) | 28 (%93.3) | 28 (%93.3) |
| **Swelling-limb (Experienced groin swelling)** | 0 (%0) | 30 (%100) | 30 (%100) |
| **Heaviness (Experienced heaviness)** | 1 (%3.3) | 19 (%63.3) | 20 (%66.6) |
| **Aching (Experienced aching)** | 9 (%30) | 6 (%20) | 15 (%50) |

Correlation analysis was applied to the GCLQ-7 values and the circumference measurements. In the LE group, there was a low level of correlation between the left lower extremity circumference measurements at 5cms, 10cms, 15cms, 20cms and 25cms and the GCLQ-7 total scores (0.277, 0.293, 0.291, 0.293 and 0.244, respectively). The correlations between the GCLQ-7 and the lower extremity circumference measurements were shown in Table 6.

**Table 6.** Correlation between GCLQ-7 total score and circumference measurement

| | **Latent group (n:27)** | | **LE group(n:70)** | |
|---|---|---|---|---|
| | **Total score** | | **Total score** | |
| | Right | Left | Right | Left |
| **Medial malleol** | 0.051 | 0.165 | 0.043 | 0.216 |
| | 0.802 | 0.411 | 0.725 | 0.072 |
| **5 cm** | 0.238 | 0.165 | 0.08 | 0.277* |
| | 0.232 | 0.411 | 0.512 | 0.02 |
| **10cm** | 0.093 | 0.089 | 0.094 | 0.293* |
| | 0.644 | 0.658 | 0.437 | 0.014 |
| **15cm** | 0.017 | 0.122 | 0.087 | 0.291* |
| | 0.932 | 0.543 | 0.472 | 0.015 |
| **20cm** | 0.043 | 0.032 | 0.091 | 0.293* |
| | 0.831 | 0.873 | 0.452 | 0.014 |
| **25cm** | -0.04 | 0.01 | 0.083 | 0.244* |
| | 0.843 | 0.962 | 0.497 | 0.042 |
| **30cm** | -0.076 | 0.038 | 0.079 | 0.194 |
| | 0.707 | 0.849 | 0.517 | 0.108 |

*Table 6 (continued)*

| | | | | |
|---|---|---|---|---|
| **35cm** | 0.065 | 0.151 | 0.092 | 0.161 |
| | 0.746 | 0.452 | 0.451 | 0.183 |
| **40cm** | 0.116 | 0.097 | 0.061 | 0.192 |
| | 0.566 | 0.629 | 0.618 | 0.112 |
| **45cm** | 0.172 | 0.146 | 0.064 | 0.197 |
| | 0.39 | 0.469 | 0.596 | 0.103 |
| **50cm** | 0.102 | 0.102 | 0.086 | 0.172 |
| | 0.611 | 0.614 | 0.48 | 0.154 |
| **55cm** | 0.075 | 0.059 | 0.117 | 0.163 |
| | 0.711 | 0.769 | 0.335 | 0.178 |
| **60cm** | 0.083 | 0.087 | 0.134 | 0.157 |
| | 0.68 | 0.666 | 0.269 | 0.195 |
| | -0.023 | -0.008 | 0.03 | 0.081 |
| **Inguinal region** | 0.91 | 0.969 | 0.806 | 0.503 |

**p<0.05 statistically significant, r: Spearman Correlation Coefficient*

The Receiver Operating Characteristic (ROC) analysis results for the total symptom scale score of GCLQ-7 showed that the total score could quite successfully differentiate patients with LELE from those without LELE. The ROC curve values for the GCLQ were shown in Figure 2.

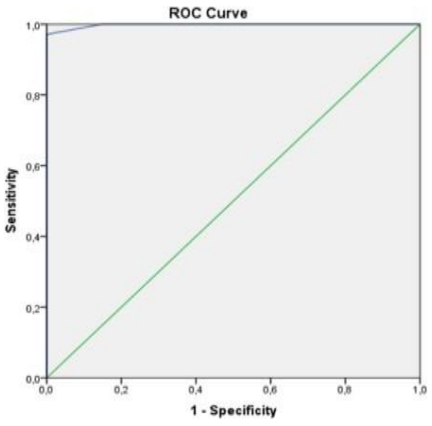


***Figure 2.*** ROC curves of the individual GCLQ-7 total scores

From the examination of the total scores obtained from 7 items to determine the presence of lymphedema, the area under the curve (AUC) value obtained was 0.998 (S.E=0.002; p=0.0001; 95% C.I= 0.993 – 1). Assuming 1.5 as the ideal cut-off point for lymphedema discrimination, the sensitivity was determined to be 100% and specificity 85.2%. When 2.5 was taken as the cut-off value, sensitivity was 97.1% and specificity was 100%.

**DISCUSSION**

This study was conducted to evaluate the reliability and validity of the GCLQ-7, which was designed as a symptom scale for the evaluation of patients who developed LE after gynecological cancer surgery. The results of the study demonstrated that the Turkish version of the GCLQ-7 is a reliable and valid scale that can objectively measure the differential symptoms to diagnose LE.

Lymphedema occurs at a rate of 20–30% in patients with gynecological cancer, depending on the extent of surgical treatment, the number of lymph nodes removed, the radiotherapy sessions received, and obesity (Van Akkooi, Bouwhuis, Van Geel et al., 2007). Symptoms such as pain, loss of lower extremity range of motion, feeling of heaviness and skin problems may occur due to LE. The thickening of the skin in particular, and the increase in LE can greatly limit the quality of life of the individual (Ahmed, Prizment, Lazovich et al., 2008). Therefore, it is very important to be aware of the symptoms in advance to be able to make an early diagnosis of LE.

The GCLQ consists of 7 symptom clusters and 20 questions, whereas the GCLQ-7 was created by taking one question from the 7 symptom clusters of the Korean version of the GCLQ.

The Turkish version of the GCLQ was prepared by Abakay et al. (Abakay, Abdülrezzak and Akbayrak, 2022). In this study, the adaptation, validity and reliability of the GCLQ-7 was evaluated in a Turkish population.

Reliability was evaluated using the internal consistency method. The Cronbach alpha coefficient was used to express internal consistency. While the internal consistency reliability of the total score of the GCLQ-7 developed in Korea was 0.699, in the current study, the Cronbach alpha value of the total score of GCLQ-7 was found to be 0.835. In addition, the Cronbach alpha values obtained as a result of the examination of the 7 items were general edema: 0.769, physical functionality: 0.778, numbness: 0.785, extremity edema: 0.769, infection: 0.841, heaviness: 0.848, and pain: 0.871. The internal consistency of all the items ranged from moderate to high (DeVellis, 2003). In this study, the Cronbach alpha value (0.835) was found to have high internal consistency reliability in the total evaluation of the GCLQ-7.

The ICC values between the two assessments were used in the test-retest analysis. For test-retest reliability, the GCLQ-7 was applied to the same sample twice after an interval of 1 week. When the harmony and changes in the scale items were examined, items 1, 2, 4, and 5 (Physical functioning, Swelling-general, Swelling-limb, Numbness) were seen to have high consistency, and items 3, 6, and 7 (Infection related (40%), Heaviness (66.6%), Aching (50%)) had low consistency. The reason for this was thought to be the improvements in clinical edema and pain in 1 week in the patients participating in the study. A ROC curve was drawn with a total score of 1, and the AUC defined the most distinctive items. When the ROC analysis results for the total symptom score in the GCLQ-7 were analyzed, it was seen that the total score could distinguish patients with and without LELE quite successfully (AUC: 0.998 (95% C.I= 0.993 – 1). The Korean GCLQ-7 reported AUC: 0.945(95%CI,0.900-0.991) (11). The current study's results showed that the Turkish GCLQ-7 was generally compatible with the Korean GCLQ-7.

Early diagnosis in lymphedema is important because the edema is reversible, and fibrosis does not occur in the tissue. Bioimpedance spectroscopy, circumferential measurements, and lymphoscintigraphy are among the various diagnostic methods of LE (O'Donnell, Allison and Iafrati, 2020). As of today, there is no consensus in the literature on a clinical diagnostic standard for detection and evaluation. Subjective measurements can be considered valuable because the appointment dates given for objective measurement methods are sometimes delayed for a long time. In this study, the circumference measurements, which are widely used in clinics, were used to measure edema by measuring at 5 cm intervals (Akbayrak, Kaya, Deligöz et al., 2007). When the correlations were examined between the GCLQ-7 score and circumference measurements, the low level of correlation between 5cm, 10cm, 15cm, 20cm and 25cm left lower extremity circumference measurements and GCLQ-7 total scores in the LE group indicated that edema was mostly concentrated in the left lower extremity and below the knee region. The low level of relationship between GCLQ-7 and the circumference measurements in the left lower extremity distal region may have affected the edema localization of the individuals in the LE group. New studies may be recommended in more patients with lymphedema of varying severity.

The results of this study demonstrated that the GCLQ-7 is a valid and reliable questionnaire for the Turkish population. It is very important to raise awareness about lower extremity lymphedema symptoms that may occur in women who have had gynecological cancer. The implementation of long and complex questionnaires is time-consuming,

which can lead to a decrease in the concentration of the patients and incomplete or incorrect answers to the questions. Although many patients with lymphedema seek information from healthcare professionals, this usually happens only after symptoms occur. This issue should be addressed with screening modalities and training programs before symptoms develop. The GCLQ-7 may be sufficient to question the presence of lymphedema in the clinic. This questionnaire can also be considered to be an objective scale for evaluations before and after treatment in patients with lower extremity lymphedema and can be used in scientific studies. Early management of symptoms (eg, limb weight, pain, swelling) will contribute to the treatment process and the patient's quality of life.

### *Ethical Approval*

Ethics committee permission was granted by Hacettepe University Non-Interventional Clinical Research Ethics Committee with decision number GO 18/1203 dated 18.12.2018.

### *Authors' Contribution*

Hanife ABAKAY: Study design, data collection, data analysis and writing, Duygu Sultan ÖGE: Providing the cases, critical review, Türkan AKBAYRAK: Idea development, critical review, interpretation.

### *Conflicts of Interest*

None.

### *Acknowledgments*

None.

**Kaynaklar**

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