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Reliability And Validity Study For Quick Assessment Scale Of Lymphoedem Management Information

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ABSTRACT

Objective: A scale to evaluate knowledge about lymphedema has not been found in the Turkish literature before. With this study, it was aimed to develop a scale that enables the evaluation of the level of knowledge of healthcare personnel on lymphedema management.
Materials and Methods: The permission for this methodological study was obtained from the Ethics Committee of University Faculty of Medicine with protocol 31 number 1453. Application permission was obtained from University Rectorate Practice and Research Hospital Chief Physician. With literature review, the item pool of the Lymphedema Management Knowledge Scale, consisting of 35 45 items including the headings of ”etiology, diagnosis, treatment, and lifestyle”, was organized. For 36 the evaluation of the scale, opinions of 16 faculty members who are experts in the field of Physical Therapy and Rehabilitation were consulted.
Results: In our study, lymphedema management was gathered under four main headings and a conceptual framework was created, and it was seen that it was appropriate to evaluate all the questions in one dimension after the construct and reliability validity analyses. The scale is suitable for real life and easy to apply in terms of the questions it contains.
Conclusion: With this Lymphedema Management Information Rapid Assessment Scale, which was developed by reviewing the literature and taking expert opinions, the quality of counselling services provided to lymphedema patients will be raised, and the rise in protective measures will increase the quality of life of the patients

Keywords: lymphoedema,assessment scale,reliability and validity

ÖZET

Amaç: Lenfödemle ilgili bilgiyi değerlendirecek bir ölçeğe Türkçe literatürde daha önce rastlanmamıştır. Bu çalışma ile sağlık personelinin lenfödem yönetimine ilişkin bilgi düzeyinin değerlendirilmesini sağlayacak bir ölçeğin geliştirilmesi amaçlandı.
Materyal ve Metot: Bu metodolojik çalışma için Üniversite Etik Kurul’dan 31 sayılı, 1453 Protokolü ile onay alınmıştır. Araştırma Hastanesi Başhekimliğinden uygulama izni alınmıştır. Literatür taramasıyla Lenfödem Yönetimi Bilgi Ölçeği’nin ”etiyoloji, tanı, tedavi ve yaşam tarzı” başlıklarını içeren 45 maddeden oluşan değerlendirme ölçeği

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oluşturulmuştur. Ölçeğin değerlendirilmesinde Fizik Tedavi ve Rehabilitasyon alanında uzman 16 öğretim üyesinin görüşlerine başvurulmuştur.
Bulgu: Bu çalışmada lenfödem yönetiminin dört ana başlık altında toplanıp kavramsal bir çerçeve oluşturulmuştur, uygulanabilirlik ve güvenirlik geçerliliği analizleri sonrasında tüm soruların değerlendirilmesinin uygun olduğu görülmüştür. İçerdiği soruların uygulanabilir ve değerlendirilmesinin kolay bir ölçek olduğu saptanmıştır
Sonuç: Uzman görüşleri alınarak literatürün gözden geçirilmesiyle geliştirilen Lenfödem Yönetimi Bilgi Hızlı Değerlendirme Ölçeği, lenfödem hastalarına verilen danışmanlık hizmetlerinin kalitesini arttıracaktır. Koruyucu önlemlerin arttırılması hastaların yaşam kalitesini artıracaktır.

Anahtar Kelimeler:lenfödem, değerlendirme ölçeği, güvenilirlik ve geçerlilik

INTRODUCTION

Lymphedema is a pathological and progressive condition that occurs with the accumulation of protein-rich lymph fluid in the interstitial space caused by an impairment in lymphatic flow(1). Lymphedema is divided into primary and secondary; primary lymphedema is a lymphatic malformation that develops at the later stage of lymphangiogenesis; secondary lymphedema is characterized by the inability of the lymphatic system that develops after tumors, surgery, trauma, infection, inflammation, and radiation therapy(2).Lymphedema is a chronic and progressive complication that can develop after cancer-related surgeries. Cancer treatment-related lymphedema originates from anatomical obliteration such as radical operative lymph dissection, irradiation, or recurrent lymphangitis resulting in lymphangiosclerosis(3). Lymphedema that occurs in the first 18 months after surgery or radiation is defined as acute lymphedema, and conservative treatment methods are effective in acute lymphedema. Chronic lymphedema is more serious, progressive, and usually irreversible. The pathological condition of lymphedema occurs with excessive accumulation of interstitial lymph fluid in the extremities, causing cellulite and swelling, and then fibrosis appears. Even if the patient is cancer-free, he or she has to fight lymphedema, which negatively affects the quality of life(4). A Breast Health Global Initiative consensus statement revealed the importance of education and awareness of lymphedema and recommended community awareness programs and patient and health professional education (5). In addition to this,in many countries, national breast cancer organizations publish guidelines that recommend lifetime behaviors to minimize lymphedema risk. Obesity, weight gain after diagnosis, upper extremity infections, heavy lifting, injury or trauma to the affected arm, overuse of the limb, and air travel are potentially evitable risk factors in these guidelines (6). Nurses provide support to patients in the use of complex decongestive treatments, including limb elevation. Exercises, manual lymphatic drainage, pneumatic compression therapy, skin care, compression garments, and bandages are used to treat lymphedema. Nurses can provide more accurate information and better understand the treatment processes of lymphedema.Therefore, the nurse should be provided with knowledge and awareness, including preventive and therapeutic practices.Several studies have evaluated the education, lymphedema prevention, and treatment. Most of their findings underscored the inadequate knowledge level and emphasized the need to improve lymphedema education and knowledge among all breast cancer survivors (7, 8). Fu et al. found a correlation between lymphedema knowledge and the risk of developing the condition (9). Also, some stressed the potential need for educational interventions to strengthen knowledge ofmanaging lymphedema. The previous literature from Turkey has published no scale to evaluate awareness and knowledge about lymphedema. Within the scope of this research, we aimed to develop a scale enabling the evaluation of the level of awareness and knowledge of healthcare professionals on lymphedema management.

MATERIALS AND METHODS

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Ethics committee approval has been granted from our institution with protocol number 2018/1453. A literature review was conducted to analyze the determinants of the Lymphedema Management Knowledge Scale on ”etiology, diagnosis, treatment, and lifestyle”phrases. SixteenPhysical Therapy and Rehabilitationfaculty members(4 Specialist Physicians, 4 Assistant Professors, 4 Associate Professors, and 4 Professors) were consulted. This committee examined the items in terms of comprehensibility and suitability for the purpose and gave their opinions by evaluating each item with a score between 1 and 4: 1 point is “the item is not appropriate,” 2 points is “the item requires major revision,” 3 points is “the item requires minor revision,” 4 points is “the item is appropriate.” The Content Validity Index (CVI) Davis technique was used for content validity (10). The CVIs of the items ranged from 0.533 to 1, according to the evaluations of 16 faculty members on the scale items (Table 1). In this context, it was decided that the scale had content validity. According to the expert feedback committee, the scale was reduced to 32 items. The items that were eliminated and reviewed at this stage are presented in Table 1. Before the scale was administered, the headings ”etiology, diagnosis, treatment, lifestyle” were removed, and the questions were randomly ordered to eliminate the effect of sequential answers. The pre-test consisted of two sections, including sociodemographic characteristics and knowledge level of lymphedema, with 32 questions. To evaluate comprehensibility, it was applied to 21 healthcare professionals, including nurses at University Public Health Department research assistants. The “Agree, par-

tially agree, Disagree, no idea" options in the scale were changed to "True, False, No idea". When the scale items were evaluated, it was found more appropriate to use the expression "blood pressure" instead of "arterial tension." In the sociodemographic section, variables such as age, gender, marital status, educational status, total working time (in years and months) were questioned. The question that may affect the knowledge of lymphedema,"Is there a history of lymphedema in you or a relative of yours?" was added. It has been reported in the literature that 5 – 10 individuals are required for each item in scale validity and reliability studies and that the sample size in scale studies is weak for 100, appropriate for 200, good for 300, very good for 500, and excellent 1000 participants (11). The sample size was calculated as 160 – 320individuals, considering the recommendation to take 5 – 10 people per item, and it was observed that 472 nurses could respond (12). An adequate sample size was obtained by reaching 233 people. Individuals were included in the study with the convenience sampling method. The data collection form was left to the nurses responsible for hospital services and intensive care units, and weekly controls were made between 3 and 6. Those included in the pre-test, those who did not agree to participate, and those who did not answer more than 20% of the questions in the questionnaire were not included in the study.

Statistical Analysis

The data were analyzedvia Statistical Product for the Social Sciences (SPSS) 26.0.Internal consistency (Cronbach's Alpha) analysis was performed to determine the scale's reliability. According to the common classification in the literature, 0.81<<1.00 scale was accepted as high reliability, 0.61<<0.80 scale as medium reliability, 0.41<<0.60 scale as low reliability, and 0.00<<0.40 scale as considered unreliable (13). The scale size was evaluated with the "Kaiser-Meyer-Olkin Criterion (KMO) for Evaluating the Sufficiency of Sample Size." The KMO statistic takes values between 0 and 1. As the value approaches 0, it becomes difficult to perform the Factor Analysis, while a value close to 1 indicates that reliable factors can be identified in the Factor Analysis results. Accordingly, values greater than 0.50 should be sought, so values above 0.50 – 0.70 are defined as "moderate," 0.70 – 0.80 as "good," 0.80 – 0.90 as "very good," and above 0.90as "extraordinary" (14).The Extraction Method Principal Component Analysis examined the scale's construct validity. While evaluating the factor analysis results, the criterion of including items with positive factor loadings and 0.32 and above in the factor was considered. Compliance with normal distribution was evaluated by visual (histogram) and analytical methods (Kolmogorov-Smirnov). Since the total score did not show a normal distribution, the total score according to gender, the total score of those diagnosed with lymphedema or a relative with lymphedema, and the total score of those who followed up patients with lymphedema before and those who did not were compared using the Mann-Whitney U test. Kruskal Wallis test was used to compare the total scores according to education level. The Spearman correlation test was used to evaluate the correlation between age, total working time, and total score. Type I error level was accepted as 0.05.

RESULTS

A total of 233 healthcare professionals participated in this research. Since more than 20% of the questions in the eight data collection forms were not answered, 225 forms were evaluated.The median age of the participants was 27 ±6 years, and 88.9% were female. The median total working time was 72 months. The age, gender, marital status, educational status, diagnosis of lymphedema, or having a relative with lymphedema in the research group are denoted in Table 2.

Table 2: Sociodemographic characteristics of the research group

N	**%**	
Gender (n=225)		
Female	200	88,9
Male	25	11,1
Age (n=224)		
18-24 years	59	26,3
25-34 years	109	48,7
35-44 years	51	22,8
45-54 years	5	2,2
Marital status (n=222)		
Married	109	49,1
Single	109	49,1
Other	4	1,8
Educational status (n=223)		
Health Vocational High School	49	22,0
Associate degree	25	11,2
Bachelor's degree and above	149	66,8
Diagnosis of lymphedema or having a relative with lymphedema (n=221)		
Yes	11	5,0
No	210	95,0

The 25 – 34 age group constituted 48.7% of the participants. Additionally, 49.1% of the individuals were married, 49.1% were single, 66.8% had a bachelor's degree and above, 22% graduated from health vocational high school, and 11.2% had associate degree education. The percentage of those diagnosed with lymphedema in themselves or a relative was 5.0%. When the participants were asked where they got their knowledge on lymphedema, it was seen that 61.3% of them answered during undergraduate and associate degree education (Table 3).

Table 4: Reliability analysis findings of the scale

Item content	**Adjusted item-total correlation**	**Cronbach's alpha when the item is removed**
Lymphedema patients should be protected from traumas (abrasions, cuts, insect bites, sunburns. . .).	0,685	0,742
Swelling in the extremities is one of the symptoms of lymphedema.	0,547	0,753
Gloves and boots should be worn while dealing with house and garden chores.	0,496	0,762
Protective measures may be required during long-term flights, car journeys, etc.	0,616	0,741
Blood can be taken from the extremity with lymphedema, blood pressure can be measured, and injections can be made.	0,375	0,780
Salty diet increases lymphedema	0,483	0,766
Physical examination has a place in the diagnosis of lymphedema.	0,419	0,773
Increasing temperature in the extremities is one of the symptoms of lymphedema.	0,414	0,781

Table 3: From where the information on lymphedema has been gained* (n=225)

	N	**%**
During associate and undergraduate degree education	138	61,3
During graduate degree education	35	15,6
Social media	38	16,9
TV shows	18	8
Colleagues	31	13,8
Scientific publications	35	15,6

This is a question where more than one option can be ticked.

The study was completed with a total of 225 participants. Thus, seven people per item were reached as a sample size. KMO value was 0.833' with Bartlett test α <0.001. According to the KMO assessment subgroups, it was found to be at a "good" level. Before the factor analysis, the responses to the items were evaluated, and items with a reply of "No idea" were eliminated by over 20%. According to factor analysis, six factors with Eigenvalues above one and explaining 54.22% of the total variance emerged. However, since the items questioning the same subject were collected in different factors, the items were forced into a single factor, and non-working items were removed. Thus, it was seen that 42.15% of the total variance was explained. It is reported that the higher the variance ratios, the stronger the scale's factor structure. After factor analysis, the items with a factor load below 0.32, which reduced the total variance, were eliminated. Cronbach's Alpha value was 0.786; thus, the scale was finalized as eight items. This value shows that the scale has high reliability. It is requested that the item-total correlation coefficient is not a minus sign and be greater than +0.30 (+0.20). Spearman-Brown and Guttman Split-Half values were checked in the correlation value calculation between the total scores of both halves, and the Spearman-Brown value was 0.75, while The Guttman Split-Half value was found to be 0.74. It is recommended that these two reliability values be 0.70 and above. Table 4 shows the findings of the reliability analysis of the items in the final version of the scale.

While Cronbach's alpha value was 0.786, it was observed that there was no higher value when any item was removed, and so the items were preserved as they were. It was deemed appropriate to evaluate the total score of the scale over 8 points, and it was accepted that as the score increased, the level of knowledge about lymphedema increased. Participants got the highest score of 8 and the lowest score of 0. It was observed that the scale's total score and mean values did not comply with the normal distribution. The values of the scores are shown in Table 5.

Table 5: Values of the scale scores

Total		Total
N		225
Median		6
Minimum		0
Maximum		8
	25	5
	50	6
	75	7

Of the healthcare professionals, 69.3% of the participants stated that they had not followed up with patients with lymphedema before. When the total scores of those who followed up patients with lymphedema and those who did not were compared, it was seen that the median total score of those who followed the patient was higher. Still, there was no statistically significant difference (p¿0.05). The dis-

Table 6: Distribution of Lymphedema Management Knowledge Scale scores according to the sociodemographic characteristics of the participants

Variable		n	Median	Min-Max	p value
Gender	**Female**	200	6	0-8	0,607 *
	Male	25	6	0-8	
Age		224	6	0-8	0,12**
Educational status	**Health Vocational High School**	49	6	0-8	0,143***
	Associate degree	25	6	2-8	
	Bachelor's degree and above	149	7	0-8	
Total working time		225	6	0-8	0,029**
Diagnosis of lymphedema or having a relative with lymphedema	**No**	210	6	0-8	0,148*
	Yes	11	7	3-7	

**Mann Whitney U, **Spearman Correlation, ***Kruskal Wallis Test*

tribution of Lymphedema Management Knowledge Scale scores according to the sociodemographic characteristics of the participants is presented in Table 6.

DISCUSSION

Our study gathered lymphedema management under four main headings, and a conceptual framework was created. It was seen that evaluating all the questions in one dimension was appropriate after the construct and reliability validity analyses. The scale is suitable for real life and easy to apply regarding the questions it contains. The scale's total score was evaluated over 8 points, and it was accepted that the level of knowledge increased as the score increased.It was observed that there was a positive and significant correlation between the total working time and age of the participants and the total score level. When the participants were asked to ask where they got their knowledge on lymphedema, where more than one option could be ticked, the most marked (61.3%) undergraduate and associate degree education was followed by social media (16.9%). The fact that a little more than half of the participants gained knowledge in their educational lives shows that the place of lymphedema in the curriculum needs to be expanded. In addition, these answers suggest that platforms such as social media, which everyone can access daily, provide the opportunity for accurate, informative environments. The Lymphedema Life Impact Scale, developed by Weiss et al., differs from our study in that it aims to evaluate the effects of lymphedema in any extremity and is intended for lymphedema patients. This scale evaluates the physical, psychosocial, and functional disorders caused by lymphedema with 18 items and determines the severity of lymphedema (15). Unlike Weiss et al., our study aimed to measure the knowledge of the nurses who care for them, not lymphedema patients, about lymphedema management. In a recent study Liao et al. investigated the effects of nursing education on 90 cases who had surgery for malignant tumors. They hypothesized that comprehensive nursing might reduce lymphedema after surgery and facilitate postoperative rehabilitation. These interventions help patients increase their quality of life (16). In addition, Natarajan et al. conducted a study on the outcome of nursing education on the development of lymphedema in 84 nurses after breast cancer surgery. At the end of the study, they declared that nurses must get standardized training in order to prevent lymphedema from developing in patients having breast cancer surgery(7). Hacettepe University Lymphedema Application Research Center (www.lenfodem.hacettepe.edu.tr) has established patient training on preventive approaches and has provided patients with early diagnosis and treatment opportunities since 2015. In this center, individuals who need treatment are identified and directed to the treatment unit in the Physical Therapy and Rehabilitation Department(17). No research has yet been conducted for a Lymphoedema Management Scale for healthcare professionals. Current studies have focused on scale validations and patient education. Only a minority of them emphasized the importance of nursing training. Data on the training of healthcare professionals and physicians are even lower.

CONCLUSION

Nurses who provide services close to patients must have a high level of sensitivity and knowledge about diagnosing lymphedema and the approach to patients with lymphedema.With this Lymphedema Management Information Rapid Assessment Scale, the quality of counseling services provided to lymphedema patients will be raised, and the rise in protective measures will increase the patient's quality of life.

Ethics

The study protocol was approved by the Hospital Ethics committee approval has been granted from our institution

with protocol number 2018/1453. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Authorship Contributions

Declaration of competing interest:

The authors declare that they have no competing interests.

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Table 6: Content Validity Indexes of the items of the newly developed scale and evaluation

	Not appropriate	**Requires major revision**	**Requires minor revision**	**Appropriate**		**Content Validity Index**	
	1	2	3	4	Total	CVI	Evaluation
Lymphedema is a lymphatic disease.		1	5	10	16	0,937	Rectified as "Lymphedema is a disease of the lymphatic system."
There are preventive measures against lymphedema.			5	11	16	1	The item has been removed.
Lymphedema may be primary			3	12	15	1	The item has been removed.
Lymphedema may develop due to infection.		1	2	13	16	0,937	The item has been removed.
Lymphedema does not develop due to malignancy.	5	2	1	7	15	0,533	The item has been removed.
Lymphedema may develop due to scarring.		1	4	10	15	0,933	The item has been removed.
Lymphedema may develop after chemotherapy.	2	1	1	12	16	0,812	
Lymphedema does not develop after radiotherapy.	4	1		11	16	0,687	
Lymphedema is related to previous surgery.			1	15	16	1	
The type of surgical operation applied does not affect the severity of lymphedema.	5	1	1	9	16	0,625	
The drugs used by the patient do not affect the lymphedema status.	4	1	3	8	16	0,687	The item has been removed.
Cytotoxic chemotherapeutics, bisphosphonates, antipsychotics, antidiabetics may cause edema.	1	1	6	8	16	0,875	The item has been removed.
Swelling in the extremities is one of the symptoms of lymphedema.		1	1	14	16	0,937	
An increase in temperature in the extremity is one of the symptoms of lymphedema.	1	1	3	11	16	0,875	
Rash on the extremities is one of the symptoms of lymphedema.		2	2	12	16	0,875	
Physical examination has no place in the diagnosis of lymphedema.	7			9	16	0,562	
Magnetic resonance imaging is useful in the diagnosis of lymphedema.	3		3	9	15	0,8	

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Table 6: Content Validity Indexes of the items of the newly developed scale and evaluation (Continued)

Computed tomography is useful in the diagnosis of lymphedema.	5		1	9	15	0,666	
Lymphoscintigraphy is useful in the diagnosis of lymphedema.				16	16	1	
Salty diet increases lymphedema.			1	14	15	1	
Protein-rich diet reduces lymphedema.	2		1	12	15	0,866	
A low-fat diet increases lymphedema.	4	2		9	15	0,6	
Drinking plenty of water increases lymphedema.	5		1	9	15	0,666	
Extremity with lymphedema can be massaged.			1	15	16	1	
Bandages can be used to treat lymphedema.				16	16	1	
Warm treatments can be applied to the arm with lymphedema.	1	1	3	10	15	0,866	
A compression garment can be worn in the treatment of lymphedema.				16	16	1	
Blood can be drawn from the extremity with lymphedema, TA can be measured, and injections can be made.	3	2	3	8	16	0,687	
Skin care should be done with moisturizers suitable for the extremity or body part with lymphedema.				15	15	1	
Normal soaps can be used for skin cleansing.	1	1	1	12	15	0,866	
If lymphedema is suspected, the patient should be referred to the cardiology outpatient clinic.	3		2	10	15	0,8	These items have been included as a single item as "When lymphedema is suspected, a multidisciplinary approach is required".
If lymphedema is suspected, the patient should be referred to the infectious diseases outpatient clinic.		2	1	12	15	0,866	
If lymphedema is suspected, the patient should be referred to the physical therapy and rehabilitation clinic.			1	14	15	1	
If lymphedema is suspected, the patient should be referred to the general surgery outpatient clinic.	2	1	2	10	15	0,8	
If lymphedema is suspected, the patient should be referred to the cardiovascular surgery outpatient clinic.				15	15	1	
If lymphedema is suspected, the patient should be referred to the oncology outpatient clinic.	1	1	3	10	15	0,866	

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Table 6: Content Validity Indexes of the items of the newly developed scale and evaluation (Continued)

Surgery can be used in the treatment of lymphedema.		2		13	15	0,866	
Exercise can be performed with extremities with lymphedema.				15	15	1	
Lymphedema does not restrict daily activities.	3	1	2	9	15	0,733	The item has been removed.
Extremities with lymphedema should be protected from traumas (abrasions, cuts, insect bites, sunburns).			1	14	15	1	
Manicures and pedicures should not be performed on an extremity with lymphedema.			1	14	15	1	
Gloves and boots should be worn while dealing with house and garden chores.			1	14	15	1	
Open shoes such a ssandals can be worn.	1	1	1	12	15	0,866	The item has been removed.
Tight clothing should not be worn in lymphedema.	1			14	15	0,933	Rectified as “Shoes with closed toe cap should be preferred.”
It is not necessary for the patient known to have lymphedema to resort to protective measuresduring long-term flights, car, etc. journeys.	3	2	1	9	15	0,666	Rectified as “Protective measures may be required during long-term flights, car, etc. journeys.”