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Behaviors to Prevent Lymphedema and Functional Use of Arms of Patients with Breast Cancer after Surgery

Meme Kanserli Hastaların Cerrahi Tedavi Sonrası Kollarını Fonksiyonel Olarak Kullanma Durumları ve Lenfödem Önlemeye Yönelik Davranışları

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Özet

Amaç: Tanımlayıcı tipte olan bu çalışmanın amacı meme kanserli hastaların cerrahi tedavi sonrası kollarının fonksiyonel kullanma ve lenfödem önleme davranışlarını belirlemektir.

Gereç ve Yöntem: Çalışma 125 hasta ile gerçekleştirildi. Veriler Hasta Tanıtım Formu ve Kol, Omuz ve El Sorunları Anketi-DASH'ın Türkçe versiyonu kullanılarak toplandı. Verilerin istatistiksel değerlendirilmesinde ki kare, Fisher exact ve Independent-Samples t testi kullanıldı.

Bulgular: Cerrahi tedavi sonrası meme kanserli kadınların %21,6'sında lenfödem tespit edildi. Hastaların egzersiz durumu ile lenfödem gelişimi arasında anlamlı fark bulunmazken, egzersiz süresi ile lenfödem varlığı arasında anlamlı fark olduğu belirlendi ($p<0,05$). Araştırmaya katılan kadınların DASH puan ortalaması $25,57 \pm 15,86$ olarak bulundu. Lenfödemli olan kadınların DASH skoru daha yüksek ve kol güçsüzlüğü daha fazlaydı.

Sonuç: Hemşirelerin meme kanserli kadınlara eğitim ve danışmanlık vermeleri, cerrahi tedavi sonrası düzenli takip edilerek hastaları önerilen egzersizleri yapmaları konusunda bilgilendirmeleri önerildi.

Anahtar kelimeler: Meme kanseri, lenfödem, DASH anketi

Abstract

Objective: The aim of this descriptive study was to determine the behaviors to prevent lymphedema and functional use of arms patients with breast cancer after surgery.

Material and Methods: The study was conducted with 125 patients. The data were collected using the Patient Information Form and the Turkish version of the Disabilities of the Arm, Shoulder and Hand Questionnaire-DASH. Chi square, Fisher exact and Independent-Samples t test were used for statistical evaluation of the data.

Results: Lymphedema was detected in 21.6% of the women with breast cancer after surgical treatment. There was no significant difference between exercise status and lymphedema development of the women, but there was a significant difference between exercise duration and the presence of lymphedema ($p<0.05$). The DASH mean score of the women in the study was found to be 25.57 ± 15.86 . The patients with lymphedema had higher DASH scores and had more arm weakness.

Conclusion: It is recommended that nurses give training and consultancy to women with breast cancer and inform patients to do the recommended exercises by regular followups after surgical treatment.

Keywords: Breast cancer, Lymphedema, DASH questionnaire

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INTRODUCTION

World Health Organization (WHO) (2018) statistics emphasized that breast cancer is ranked second, after cardiovascular diseases, in the ranking of known deaths (1). Turkish Statistical Institute (2018) showed that benign and malignant tumors take second place with a rate of 19.7% among death cases (2). According to WHO International Agency for Research on Cancer (IARC), the most frequently seen cancer types are lung, breast, and colorectal cancers (3). The data of Health Statistics Yearbook of Turkey (2017) shows that breast cancer in women is ranked first with a rate of 43,8 per hundred thousand (4).

Options such as surgery, chemotherapy, and radiotherapy are utilized in the treatment of breast cancer. Surgical treatment is preferred as the primary treatment method and it is performed as mastectomy and breast-conserving surgery (5). After these surgeries, patients encounter many physical and psychosocial problems that negatively affect their quality of life (6). Complications such as seroma formation, deep vein thrombosis, pulmonary embolism, and myocardial infarction in early period and pectoralis major muscle atrophy, limited arm mobility, neuralgia, hypertrophic scars, and lymphedema in the late period can be seen after breast cancer surgery (7). Post-surgery complications such as lymphedema, wound problems, and pain cause a restriction in the arm-shoulder movements and physical activities of the patients. Reasons causing the restriction of arm and shoulder movements are the fear of the patient from moving his/her arm, and tension and pain caused by scar tissue (8). In their study, Ewertz and Jensen reported that 3-5 years after breast cancer surgery and radiotherapy, restrictions developed in arms and shoulders of 35.0% of the patients, continuous pain developed in arms and shoulders in 30.0-50.0% of the patients, and lymphedema developed in 15.0-25.0% of the patients (9).

The prevalence of lymphedema, which is one of the most important complications developing after surgical treatment of breast cancer, is between 2.0% and 83.0% (10-12), and it is accepted as approximately 30,0%. Lymphedema usually develops in the first 18 months after the surgical treatment (13). In the literature, it is reported that lymphedema caused by breast cancer develops at the rate of 50.0% after axillary lymph node dissection, 44.0% after radical mastectomy, 29.0% after modified radical mastectomy and 10.0% after breast-conserving surgery (6). Patients with lymphedema cannot move their arms comfortably due to pain, swelling, tension, weakness in the arm, and functional disability and they have difficulty in performing their daily life activities and their roles in the family.

In addition, due to the appearance of the arms with lymphedema, the body images of the patients deteriorate and their self-esteem decreases (6,14). After surgical treatment of breast cancer, it is possible to reduce the functional disability in the arms of the patients and to prevent the development of lymphedema via patient education and regular exercise programs (15). Postoperative arm exercises recover the muscle strength and function of the upper extremity and reduce pain and discomfort (16). In the prevention of lymphedema, patients should avoid exposure to extreme heat and cold, pushing and pulling objects with the affected arm, lifting heavy objects, and measuring blood pressure from the affected arm, they should be provided with a correct diet for weight control and should apply risk-reducing behaviors such as skin care and massage (16,17). In a study, it was shown that the development and progress risk of lymphedema due to mastectomy decreased with the education and exercise provided by nurses in early period (18).

Identifying the conditions in the prevention of lymphedema after the surgical treatment of breast cancer is also important as its prevention. However, there is a limited number of studies in the literature. The aim of the present study was to determine the functional use of the arms of women with breast cancer after surgical treatment and their behaviors for preventing the development of lymphedema.

MATERIALS AND METHODS

Study Design

This descriptive study was conducted to determine the functional use of the arms of the women with breast cancer after surgical treatment and their behaviors to prevent lymphedema.

Sample of the Study

The sample of the study was calculated as at least 120 people at confidence interval of 95% and by taking the prevalence as 0.30 (13) via the sample formula with known population in which the number of individuals in the population was known. In the study, 125 women with breast cancer, who received surgical treatment for breast cancer at the Medical Oncology and Radiation Oncology Service and Oncology Daily Treatment Center and agreed to participate in the study, were included.

Data Collection

In the study, the data were collected by the researcher between November 2017 and February 2018 using the patient information form prepared by the researcher and the Turkish version of the Disabilities of the Arm, Shoulder and Hand (DASH).

Patient Information Form

This form, prepared by the researcher by reviewing the related literature (14-19), consists of two parts. The first part consists of 20 questions about the socio-demographic characteristics of the patients, the type of surgical treatment, information about lymphedema, and the behaviors oriented towards the prevention of lymphedema. The presence and severity of lymphedema were evaluated by the researcher by measuring the arm circumference. In the second part, there are 26 questions related to the evaluation of behaviours for preventing lymphedema (17,19,20).

Disabilities of the Arm, Shoulder and Hand (DASH)

The DASH questionnaire was developed by Hudak *et al.*, in 1996 (21). The Turkish validity and reliability study was carried out by Düger *et al.*, in 2006 (22). The DASH questionnaire consists of three parts. The first part includes 30 questions, 21 of which assess the difficulty experienced by patients during activities of daily life, 5 evaluate symptoms (pain, activity-induced pain, tingling, stiffness, weakness), and each of the remaining 4 questions assesses social function, work, sleep, and self-confidence of the patient. The first part determines the function/symptom score of the patient. In addition to the first part, the business model consisting of 4 questions and being answered optionally evaluates the disability of the patient in the business life. The sports and musicians section consisting of 4 questions determines the disability level of the patients who are engaged in sports or music.

In 5-point likert scale, 1: no difficulty, 2: mild difficulty, 3: moderate difficulty, 4: severe difficulty, 5: Unable. The sum of the scores obtained is converted into a total score varying between 0 and 100 points by using a formula developed for the questionnaire (0=no disability, 100 = maximum disability). As the score increases, the functional limitation of the arm also increases. In the study by Düger *et al.*, Cronbach's α value of DASH questionnaire is 0.910. (22). In the present study, cronbach's α value of the DASH questionnaire was found as 0.940.

Data Analysis

The data obtained were evaluated in the SPSS (IBM SPSS corp; Armonk, NY, USA) 24.00 package program. In the data assessment; mean, standard deviation, number and percentage were used in descriptive statistics and Chi-square, Fisher's exact, and Independent-Samples t test were used for testing the intergroup difference. $p < 0.05$ was accepted as significant in statistical assessment.

In order to conduct the study, approval from the Erciyes University Ethics Committee, approval from the Non-Interventional Clinical Research Ethics Committee (No: 2017.10.06), and institutional permission from Erciyes University From the Health Practice and Research Hospital were obtained. The patients participating in the study were informed about the aim and design of the study. After informing, the Informed Consent Form was signed. This study is conducted in accordance with ethical principles of the Declaration of Helsinki

RESULTS

In the study, it was found that the mean age of the women with breast cancer was 53.47 ± 11.56 , 32.0% were 61 years old and above, 42.4% were obese, 90.4% were married, 50.4% were primary school graduates, and 92.8% had children. In this study, 55.2% of the participants had mastectomy surgery, 64.0% of them underwent Axillary Lymph Node Dissection (ALND).

In the study, 21.6 % of the women with breast cancer currently had a lymphedema, and 80.6% had lymphedema that developed in the first 18 months after the surgery. Also, it was determined that 15.4% of the patients received treatment for lymphedema, 94.4% received education about lymphedema, 64.4% received education about restriction and exercise, 54.4% exercised after surgery, and only 7.2% of the patients, who expressed that they exercised, exercised regularly (Table 1).

Our study found that 8.8% of the women with breast cancer had the procedures such as injection and blood pressure measurement performed from the arm on the side of the surgery, 24.0% did not protect the arm on the side of the surgery from sunlight, and 80.0% did not apply simple lymphatic drainage massage (Table 2).

It was determined that 41.5% of those performing rod exercise did their exercises 15 times and more. It was determined that 40.0% of the women who applied simple lymphatic drainage massage, performed the massage for 30 min. and more (Table 3).

It was found that lymphedema developed in 54.5% of the patients who had the procedures such as measurement of blood pressure and injection done from the side of surgery ($p < 0.05$). It was found that lymphedema developed in 36.7% of the patients who did not protect their arm on the side of the surgery from sunlight ($p < 0.05$). Lymphedema developed in 37.9% of women with breast cancer who did not avoid rigid, compelling movements and carrying heavy loads ($p < 0.05$) (Table 4).

Table 1. Distribution of the lymphedema characteristics of women with breast cancer (N=125)

Characteristics	N	%
Presence of a current lymphedema		
Yes	27	21.6
No	98	78.4
Size of the current lymphedema (cm) (n=27)		
2-5 cm	23	85.2
More than 5 cm	4	14.8
Presence of a lymphedema before		
Yes	15	12.0
No	110	88.0
Lymphedema Area (previously and currently)		
Arm and hand	13	41.9
Only upper arm	2	6.5
Upper and lower arms	2	6.5
Lower arm and hand	4	12.8
Only lower arm	7	22.6
Only hand	3	9.7
Status of taking a lymphedema treatment (n=27)		
Yes	4	15.4
No	23	84.6
Status of receiving education about lymphedema		
Yes	118	94.4
No	7	5.6
Subject of education (n=118)		
Exercise	16	13.6
Restriction	26	22.0
Exercise and Restriction	76	64.4
Time of education (n=118)		
After the lymphedema	2	1.7
Before the surgery	5	4.2
After the surgery	111	94.1
Status of doing exercise after the surgery		
Yes	68	54.4
No	57	45.6
Status of doing regular exercise		
Yes	9	7.2
No	116	92.8
Development period of the lymphedema (previously and currently)		
0-18 months	25	80.6
19-36 months	3	9.7
36 Months and more	3	9.7

Our study found that less lymphedema developed in patients who performed hair combing exercise, arm shaking exercise, hand shaking and relaxing exercise, rope twisting exercise, back touching exercise, wall climbing exercise, and rod exercise for 15 times and more in a day and this difference was statistically significant ($p<0.05$) (Table 5).

Also, in the study, DASH mean score of women with breast cancer was found to be 25.57 ± 15.86 . When the presence of lymphedema and DASH scores were compared, it was determined that DASH scores of women with lymphedema (32.68 ± 15.66) were higher than women with no lymphedema (23.61 ± 15.42) ($p<0.05$).

Table 2. Distribution of behaviors of women with breast cancer regarding the prevention of lymphedema

Behaviors for preventing lymphedema	Yes		No	
	<i>n</i>	%	<i>n</i>	%
Measuring blood pressure from the arm on the side of surgery	11	8.8	114	91.2
Procedures such as injection from the arm on the side of surgery	11	8.8	114	91.2
Protecting the arm on the side of surgery from sunlight	95	76.0	30	24.0
Using protective gloves during housework	17	13.6	108	86.4
Avoiding rigid, compelling movements and carrying heavy loads	96	76.8	29	23.2
Using a moisturizing cream	53	42.4	72	57.6
Using pressurized armlet during an air travel*	6	4.8	119	95.2
Using a lymphedema bracelet	14	11.2	111	88.8
Going to health controls regularly	120	96.0	5	4.0
Protecting the arm on the side of surgery from burns	69	55.2	56	44.8
Applying a diet program that is special for the patient	21	16.8	104	83.2
Avoiding wearing tight clothes that apply pressure on the arm on the side of surgery	107	85.6	18	14.4
Avoiding taking showers with hot water (sauna, Turkish bath)	106	84.8	19	15.2
Avoiding wearing jewelry on the arm on the side of surgery	93	74.4	32	25.6
Using lotion for the prevention of fly and insect stings	6	4.8	119	95.2
Keeping the arm above heart level during resting	73	58.4	52	41.6
Simple lymphatic drainage massage	25	20.0	100	80.0
Observing the arm in front of a mirror	56	44.8	69	55.2
Measuring the arm for lymphedema	23	18.4	102	81.6

*Only 6 of the patients had air travel.

Table 3. Distribution of periods for arm exercises and some behaviors of women with breast cancer regarding the prevention of lymphedema

Exercises	Period			
	Less than 15 (days)		15 and over (days)	
	<i>n</i>	%	<i>n</i>	%
Hair combing exercise (<i>n</i> =79)	49	62.0	30	38.0
Arm shaking exercise (<i>n</i> =76)	48	63.2	28	36.8
Hand shaking and relaxing exercise (<i>n</i> =84)	56	66.7	28	33.3
Rope twisting exercise (<i>n</i> =67)	40	59.7	27	40.3
Touching the back exercise (<i>n</i> =78)	49	62.8	29	37.2
Wall climbing exercise (<i>n</i> =81)	52	64.2	29	35.8
Rod exercise (<i>n</i> =65)	38	58.5	27	41.5
	Less than 30 min		30 min and more	
Simple lymphatic drainage massage (<i>n</i> =25)	15	60.0	10	40.0
	Less than 7 per week		7 and more per week	
Observing the arm in front of a mirror (<i>n</i> =56)	44	78.6	12	21.4
	Less than 4 per month		4 and more per month	
Measuring the arm for a lymphedema (<i>n</i> =22)	17	77.3	5	22.7

Table 4. Comparison of the behaviors of women with breast cancer regarding the prevention of lymphedema and the presence of lymphedema

Behaviors regarding the Prevention of Lymphedema	Presence of lymphedema						Test
	Yes (n=27)		No (n =98)		Total (n =98)		
	n	%	n	%	n	%	
Measuring blood pressure from the arm on the side of surgery							
Measured	6	54.5	5	45.5	11	8.8	p=0.013*
Not measured	21	18.4	93	81.6	114	91.2	
Procedures such as injection from the arm on the side of surgery							
Had a procedure	6	54.5	5	45.5	11	8.8	p=0.013*
Did not have a procedure	21	18.4	93	81.6	114	91.2	
Protecting the arm on the side of surgery from sunlight							
Protected	16	16.8	79	83.2	95	76.0	p=0.021
Not protected	11	36.7	19	63.3	30	24.0	
Using protective gloves during housework							
Used	3	17.6	14	82.4	17	13.6	p=0.000
Not used	24	22.2	84	77.8	108	86.4	
Avoiding rigid, compelling movements and carrying heavy loads							
Avoided	16	16.7	80	83.3	96	76.8	p=0.015
Not avoided	11	37.9	18	62.1	29	23.2	
Protecting the arm on the side of surgery from burns							
Protected	13	18.8	56	81.2	69	55.2	p=0.405
Not protected	14	25.0	42	75.0	56	44.8	
Applying a diet program special for the patient							
Applied	3	14.3	18	85.7	21	16.8	p=0.562*
Not applied	24	23.1	80	76.9	104	83.2	
Avoiding wearing tight clothes that apply pressure on the arm on the side of surgery							
Avoided	22	20.6	85	79.4	107	85.6	p=0.538*
Not avoided	5	27.8	13	72.2	18	14.4	
Taking shower with hot water (sauna, Turkish bath)							
Took	7	36.8	12	63.2	106	84.8	p=0.125*
Not take	20	18.9	86	81.1	19	15.2	
Avoiding wearing jewelry on the arm on the side of surgery							
Worn	11	34.4	21	65.6	93	74.4	p=0.042
Did not wear	16	17.2	77	82.8	32	25.6	

* Fisher's exact test was applied according to the expected value levels.

Table 5. Comparison of the arm exercise regarding the prevention of lymphedema and periods for showing some behaviors in the women with breast cancer and the presence of lymphedema

Exercises and Behaviors regarding the Prevention of Lymphedema	Presence of lymphedema						Test
	Yes (n=27)		No (n =98)		Total (n =125)		
	n	%	n	%	n	%	
Hair combing exercise (n=79)							
Less than 15 times a day	14	28.6	35	71.4	49	62.0	p=0.019
15 times and over	2	6.7	28	93.3	30	38.0	
Arm shaking exercise (n=76)							
Less than 15 times a day	15	31.3	33	68.8	48	63.2	p=0.015
15 times and over	2	7.1	26	92.9	28	33.3	
Hand shaking and relaxing exercise(n=84)							
Less than 15 times a day	15	26.8	41	73.2	56	66.7	p=0.035
15 times and over	2	7.1	26	92.9	28	33.3	
Rope twisting exercise (n=66)							
Less than 15 times a day	12	30.8	27	69.2	40	59.7	p=0.022
15 times and over	2	7.4	25	92.6	27	40.3	
Touching the back exercise (n=78)							
Less than 15 times a day	12	24.5	37	75.5	49	62.8	p=0.050
15 times and over	2	6.9	27	93.1	29	35.8	
Wall climbing exercise (n=81)							
Less than 15 times a day	14	26.9	38	73.1	52	64.2	p=0.030
15 times and over	2	6.9	27	93.1	29	35.8	
Rod exercise (n=66)							
Less than 15 times a day	10	26.3	28	73.7	38	58.5	p=0.046
15 times and over	2	7.1	26	92.9	27	41.5	
Simple lymphatic drainage massage (n=25)							
Less than 30 min a day	1	6.7	14	93.3	15	60.0	p=1.000*
30 min and more	0	0.00	10	100.0	10	40.0	
Observing the arm in front of a mirror (n=56)							
Less than 7 per week	7	15.9	37	84.1	44	78.6	p=0.672*
7 and over	1	8.3	11	91.7	12	21.4	
Measuring the arm for lymphedema (n=23)							
Less than 4 times per month	2	11.8	15	88.2	17	77.3	p=1.000*
4 times and over	0	0.00	6	100.0	5	22.7	

*Fisher's exact test was applied according to the expected value levels.

DISCUSSION

The occurrence of lymphedema development after breast cancer surgery has been reported as 2-83% in the literature (11, 23-26). In the present study, it was determined that lymphedema developed in 21.6% of women with breast cancer after surgical treatment. Similar to the present study, this rate was found to be 19,5% in the study by Tsai *et al.* (27), and 22% in the study by Assis *et al.* (28). Lymphedema mostly develops in the first two years after the surgical treatment of breast cancer (27). In the current study, it was determined that lymphedema developed in the first 18 months after the surgical treatment in a great majority of the patients. Similar to the study, Norman *et al.* determined in their study that lymphedema developed mostly between 6th and 18th months after the surgery (29). Average development period for lymphedema after surgery was specified as 14 months in the study by Safwat *et al.* (30).

In the present study, it was found that there was no significant difference between the status of performing the exercises recommended to prevent lymphedema and the development of lymphedema, whereas the prevalence of lymphedema was lower in the women who performed the exercises regularly and sufficiently. In their study, Turk and Atalay specified that regular exercising after the surgery was effective in preventing the edema in the arm (20). Zhang *et al.* reported that physical exercise together with manual lymphatic drainage was beneficial in preventing lymphedema (31). According to these results, it can be asserted that performing the exercises regularly and effectively helps to prevent lymphedema.

In the literature, it is recommended to avoid repeating movements and carrying heavy loads in order to prevent lymphedema (32,33). In the present study, it was determined that lymphedema was seen less in the patients who avoided rigid, compelling movements and carrying heavy loads, which is compatible with the literature. In a study, it was stated that risk-reducing behaviors for lymphedema were effective in the prevention of lymphedema (34). In a study investigating the effects of taking blood from the affected arm, injection, measuring blood pressure, and air travel on the risk of lymphedema in patients with breast cancer after surgical treatment, no significant correlation was found with the increase in the arm volume (35). Unlike this study, in the present study, it was observed that lymphedema developed in 54,5% of the patients, who had their blood pressure measured and had an injection from the arm on the side of surgery. In their study, Kilbreath *et al.*, defined bloodletting from the affected arm as a potential risk, which supports the present study (36).

In a study conducted concerning the role of patient education and physiotherapy in control of lymphedema after breast cancer surgical treatment, it was found that patient education alone was not useful. It was found that patient education which started in the first week after the surgery and followed by physiotherapy was effective in reducing the risk of lymphedema in the patients who underwent breast cancer surgery with ALND (19). In another study, it was shown that physiotherapy including massage, and upper extremity and shoulder exercises reduced lymphedema by 65% (37).

In the present study, it was found that while lymphedema developed in 4% of women who received simple lymphatic drainage massage, it developed in 26% of women who did not apply the massage. Similar to the present study, in their study Brown *et al.* revealed that simple lymphatic drainage massage reduced lymphedema in a period of 12 months (38). Preservation of skin integrity and careful management of the skin problems are important for the management of lymphedema (33).

This study found that DASH mean score of women with breast cancer to be 25.57 ± 15.86 . It was determined that DASH scores of the women with lymphedema were higher than women with no lymphedema. Recchia *et al.* used DASH questionnaire to measure the upper extremity functionality in the patients with breast cancer and reported that the mean score was 41.03 ± 22.27 (39). In the study conducted by Dawes *et al.* to investigate the effects of lymphedema developing after breast cancer surgery on functions of upper extremity, they determined that the patients with lymphedema had higher DASH scores than women without lymphedema (40).

The study was conducted in one hospital. Therefore, our study results can only be generalized to this sample group.

These results show that patients with lymphedema that developed after the breast cancer surgery, had restricted arm, shoulder, and hand movements and had difficulty in their daily life activities. Protecting the affected arm from trauma reduces the development of lymphedema, and less lymphedema develops in patients who exercise regularly. It is recommended to provide training and counseling for nurses to follow-up women with breast cancer at regular intervals and to do the recommended exercises regularly and in sufficient numbers, and to plan randomized controlled studies to prevent lymphedema.

Ethical Approval: In order to conduct the study, approval from the Erciyes University Ethics Committee, approval from the Non-Interventional Clinical Research Ethics Committee (No: 2017.10.06), and institutional permission from Erciyes University From the Health Practice and Research Hospital were obtained. The patients participating in the study were informed about the aim and design of the study. After informing, the Informed Consent Form was signed. This study is conducted in accordance with ethical principles of the Declaration of Helsinki

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REFERENCES

- World Health Organization. World Health Statistic 2018: Monitoring Health For The Sdgs, Sustainable Development Goals. Geneva. 2018
- Türkiye İstatistik Kurumu. Ölüm Nedeni İstatistikleri 2018. TÜİK Haber Bülteni, Sayı: 30626. 2019
- Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre AT, Jemal A. Global Cancer Statistics 2018: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *Cancer J Clin.* 2018; 68:394–424.
- Sağlık İstatistikleri Yıllığı 2017. Available From: URL: <https://dosyasb.saglik.gov.tr/Eklenti/31096,Turkcesiydijiv1pdf.Pdf?031.10.2020>
- Büyükcakıncak Ö, Akyol Y, Özen N, Ulus Y, Cantürk F, Tander B, ve ark. Meme Kanseri Cerrahisi: Üst Ekstremité İçin Bir Problem Midir? *Türkiye Fiziksel Tıp ve Rehabilitasyon Dergisi* 2013; 59:304-309.
- Güler DS. Meme Kanseri Nedeniyle Ameliyat Olan Hastalarda Kendi Kendine Lenfödem Yönetimi. *Meme Sağlığı Dergisi* 2008; 4(2): 62-69.
- Zaralı O, Karaman N, Özasan C, Hüseyinova S, Altınok M. Long-Term Complications Associated with Mastectomy and Axillary Dissection. *Acta Oncologica Turcica* 2009; 42: 17-23.
- Doğan L, Akıncı M, Çetin B, Kızıltan G, Karaman N, Altınok M. Mastektomi Sonrası Kol ve Omuzun Pozisyonu Önemli midir? *Acta Oncologica Turcica* 2009; 42:114-117.
- Ewertz M, Bonde JA. Late Effects of Breast Cancer Treatment and Potentials for Rehabilitation. *Acta Oncologica* 2011; 50: 187–193.
- Clark B, Sitzia J, Harlow W. Incidence and Risk of Arm Oedema Following Treatment for Breast Cancer: A Three-Year Follow-Up Study. *QJM: An International Journal of Medicine* 2005; 98(5): 343–348.
- Harris SR, Hugi MR, Olivetto IA, Levine, M. Clinical Practice Guidelines for The Care and Treatment of Breast Cancer: 11. Lymphedema. Canadian Medical Association or Its Licensors CMAJ 2001; 164: 191-199.
- Deo SVS, Ray S, Rath GK, Shukla NK, Kar M, Asthana S, et al. Prevalence and Risk Factors for Development of Lymphedema Following Breast Cancer Treatment. *Indian Journal of Cancer* 2004; 41(1): 8-12.
- Hayes SC, Janda M, Cornish B, Battistutta D, Newman B. Lymphedema After Breast Cancer: Incidence, Risk Factors, and Effect on Upper Body Function. *Journal of Clinical Oncology* 2008; 26(21):3536-3542.
- Akkaş GA. Meme Kanseri Tedavisine Bağlı Lenfödem ve Hemşirelik Bakımı. *Cumhuriyet Üniversitesi Hemşirelik Yüksekokulu Dergisi* 2005; 9(2): 18-25.
- Yavuz KA, Gök ÜF. Mastektomili Hastalarda Evde Bakım. *Meme Sağlığı Dergisi* 2008; 4(1): 3-8.
- Hawash MAE, Alaa Elden S, El Shatby A, El Moghazy, H, Hamida M. Effect of Nursing Rehabilitation Program on The Prevention of Lymphedema among Post Mastectomy Women. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)* 2018; 7(86):68-87.
- Çavdar İ, Kostanoğlu A, Karayurt Ö, Yıldız FÜ, Turan A, Kanan N. Genel Semptomların Yönetimi-Lenfödem. *Onkoloji Hemşireliğinde Kanıttan Uygulamaya-Konsensus.* 2014; 25-39. İstanbul.
- Şişman H, Şahin B, Duman BB, Tanrıverdi G. Nurse-Assisted Education and Exercise Decrease The Prevalence and Morbidity of Lymphedema Following Breast Cancer Surgery. *JBUON* 2012; 17:565–569.
- Nemli A, Tekinsoy Kartin P. Effects of Exercise Training and Follow-Up Calls at Home on Physical Activity and Quality of Life after a Mastectomy. *Jpn J Nurs Sci.* 2019 Jul;16(3):322-328. Doi: 10.1111/Jjns.12243.
- Türk G, Atalay M. Mastektomi Sonrası Yaptırılan Egzersizlerin Kol Ödemini Önlemeye Etkisi. *Meme Sağlığı Dergisi* 2007; 3(3):143-149.
- Hudak PL, Amadio PC, Bombardier C. Upper Extremity Collaborative Group, "Development of an Upper Extremity Outcome Measure: The DASH (Disabilities of The Arm, Shoulder, And Hand). *American Journal of Industrial Medicine* 1996; 29:602-608.
- Düger T, Yakut E, Öksüz Ç, Yörükcan S, Milgüta BS, Ayhan Ç. Kol, Omuz, El Sorunları (Disabilities Of The Arm, Shoulder And Hand-DASH) Anketi Türkçe Uyarlamasının Güvenirliği ve Geçerliliği. *Fizyoterapi Rehabilitasyon* 2006; 17(3), 99- 107.
- Yılmaz E, Coşkun T. Meme Kanseri Hastalarında Üst Ekstremité Sorunları ve Yaşam Kalitesi. *Bakırköy Tıp Dergisi* 2019; 15:29-37.
- Hayes SC. Review of Research Evidence on Secondary Lymphoedema: Incidence, Prevention, Risk Factors and Treatment. *National Breast and Ovarian Cancer Centre Australia* 2008; 19-25.
- Armer JM, Stewart BR. Post-Breast Cancer Lymphedema: Incidence Increases from 12 To 30 To 60 Months. *Lymphology* 2010; 43:118-127.
- Shih YT, Xu Y, Cormier JN, Giordano S, Ridner SH, Buchholz TA, et al. Incidence, Treatment Costs, and Complications of Lymphedema After Breast Cancer Among Women of Working Age: A 2-Year Follow- Up Study. *Journal Clinical Oncology* 2009; 27(12): 2007-2014.
- Tsai RJ, Dennis LK, Lynch CF, Snetselaar LG, Zamba GKD, Scott-Conner C. Lymphedema Following Breast Cancer: The Importance of Surgical Methods and Obesity. *Front Womens Health* 2018; 3(2):1-17.
- Assis MR, Marx AG, Magna LA, Ferrigno ISV. Late Morbidity in Upper Limb Function and Quality of Life in Women After Breast Cancer Surgery. *Braz J Phys Ther.* 2013; 17(3):236-243.

29. Norman SA, Localio AR, Kallan MJ, Weber AL, Simoes THA, Potashnik SL, et al. Risk Factors for Lymphedema after Breast Cancer Treatment. *Cancer Epidemiol Biomarkers Prev.* 2010; 19(11):2734-2746.
30. Safwat Y, Shaalan M, Mokhtar M, Hamood M. Risk Factors of Upper-Arm Lymphedema After Breast Cancer Treatment. *Journal of Current Medical Research and Practice* 2017; 2:73-78.
31. Zhang L, Fan A, Yan J, He Y, Zhang H, Zhong Q, et al. Combining Manual Lymph Drainage with Physical Exercise after Modified Radical Mastectomy Effectively Prevents Upper Limb Lymphedema. *Lymphat Res Biol.* 2016; 14(2):104-108.
32. Arıkan DA, Kapucu S. Management of Breast Cancer-Related Lymphedema. *Türk J Oncol.* 2016;31(4):138-148.
33. Arıkan DA, Özdemir L. Lenfödemde Cilt Bakımı ve Koruyucu Yaklaşımlar. *Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi* 2016; 54-64.
34. Fu MR, Axelrod D, Guth AA, Cartwright F, Qiu Z, Goldberg JD, et al. Proactive Approach to Lymphedema Risk Reduction: A Prospective Study. *Ann Surg Oncol.* 2014; 21(11): 3481-3489.
35. Ferguson CM, Swaroop MN, Horick N, Skolny MN, Miller CL, Jammallo LS, et al. Impact of Ipsilateral Blood Draws, Injections, Blood Pressure Measurements, and Air Travel on The Risk of Lymphedema for Patients Treated for Breast Cancer. *Journal of Clinical Oncology* 2016; 34(7):691-699.
36. Kilbreath SL, Refshauge KM, Beith JM, Ward LC, Ung OA, Dylke ES, et al. Risk Factors for Lymphoedema in Women with Breast Cancer : A Large Prospective Cohort. *The Breast* 2016; 28:29-36.
37. Lu SR, Hong RB, Chou W, Hsiao PC. Role of Physiotherapy and Patient Education in Lymphedema Control Following Breast Cancer Surgery. *Therapeutics And Clinical Risk Management* 2015; 11: 319-327.
38. Brown JC, Kumar A, Cheville AL, Tchou JC, Troxe, AB, Harris SR, Schmitz KH. Association Between Lymphedema Self-Care Adherence and Lymphedema Outcomes among Women with Breast Cancer-Related Lymphedema. *Am J Phys Med Rehabil.* 2015; 94(4):288-296.
39. Recchia TL, Prim AC, Luz CM. Upper Limb Functionality and Quality of Life in Women With Five-Year Survival After Breast Cancer Surgery. *Rev Bras Ginecol Obstet.* 2017; 39:115-122.
40. Dawes DJ, Meterissian S, Goldberg M, Mayo N. Impact of Lymphoedema on Arm Function and Health-Related Quality of Life in Women Following Breast Cancer Surgery. *J Rehabil. Med.* 2008; 40: 651-658.