T.C.
YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF SPORTS PHYSIOTHERAPY

THE EFFECT OF EXERCISE PERCEPTION ON UPPER EXTREMITY FUNCTIONS AND QUALITY OF LIFE IN PATIENTS WITH AND WITHOUT LYMPHEDEMA AFTER BREAST CANCER TREATMENT

MASTER THESIS

MELAHAT KIZILAY

ISTANBUL
2021

T.C.
YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF SPORTS PHYSIOTHERAPY

THE EFFECT OF EXERCISE PERCEPTION ON UPPER EXTREMITY FUNCTIONS AND QUALITY OF LIFE IN PATIENTS WITH AND WITHOUT LYMPHEDEMA AFTER BREAST CANCER TREATMENT

MASTER THESIS

MELAHAT KIZILAY, PT

SUPERVISOR

PROF. DR. RASMI MUAMMER

ISTANBUL
2021

THESIS APPROVAL FORM

Institute : Yeditepe University Institute of Health Sciences

Programme : Master of Sports Physiotheraphy

Title of the Thesis : The Effect Of Exercise Perception On Upper Extremity Functions And Quality Of Life In Patients With And Without Lymphedema After Breast Cancer Treatment

Owner of the Thesis : Melahat KIZILAY

Examination Date : 28.09.2021

This study have approved as a Master Thesis in regard to content and quality by the Jury.

	Title, Name-Surname (Institution)
Chair of the Jury:	Prof. Dr. Rasmi MUAMMER Yeditepe Universty
Supervisor:	Prof. Dr. Rasmi MUAMMER Yeditepe Universty
Member/Examiner:	Prof. Dr. Ferdi BAŞKURT Süleyman Demirel Universty
Member/Examiner:	Assoc. Prof. Feyza Şule BADILLI DEMİRBAŞ Yeditepe Universty

APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated 06.10.2021 and numbered 2021/10-32.

Prof. Dr. Bayram YILMAZ

Director of Institute of Health Sciences

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

14.10.2021

MELAHAT KIZILAY

ACKNOWLEDGEMENTS

I would like to express my profound thanks to:
Prof. Dr. Rasmi MUAMMER who was my esteemed thesis advisor with his knowledge and interest during my graduate education and his patience and tolerance during my thesis period;

Prof. Dr. Feray CINEVRE SOYUPEK, the Head of the Department of Physical Therapy and Rehabilitation, Faculty of Medicine at Süleyman Demirel University, where I also worked, who led me to start working in the field of lymphedema and is my esteemed teacher who referred lymphedema patients applying to our clinic to me for my thesis, and whose support I have always felt during my professional life;

Prof. Dr. Recep ÇETİN, the Head of the Department of General Surgery, Faculty of Medicine at Süleyman Demirel University, and Specialist Doctor Mümtaz ERAKIN, a Surgical Oncology sub-branch assistant, who helped with the referral of patients despite their intense work;

Res. Assist. Specialist Physiotherapist Merve KARAPINAR, who was with me before, during and after my thesis process and every time I got bored and who is the architect of the statistical part of my thesis;

Assist. Prof. Op. Dr. Yusuf Onur KIZILAY, an orthopedist who is my brother and supporter and who has been with me at all times with his knowledge and brotherhood;

My dear mother and father, who have supported me in all my decisions, are the biggest supporters of mine and raised me on the path paved by Mustafa Kemal Atatürk

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS AND ABBREVIATIONS

%	Symbol of Percentage
BMI	Body Mass Index
ALN	Axillar Lymph Node
ALND	Axillar Lymph Node Dissection
SLN	Sentinel Lymph Node
RT	Radiotheraphy
MRM	Modified Radical Mastectomy
BCS	Breast-Conserving Surgery
ML	Mililiter
Cm	Centimeter
Kg	Kilograms
ROM	Range Of Motion
EBBS	Exercise Benefits/Barrier Scale
LYMQOL	Lymphedema Quality of Life
SPADI	Shoulder Pain and Disability Index
DASH	Disability of Arm, Shoulder and Hand
SPSS	Statistical Package for the Social Sciences
SD	Standard Deviation
IQR	Interquartile Range
SCT	Social Cognitive Theory

ABSTRACT

Kizilay, M. (2021). The Effect of Exercise Perception on Upper Extremity Functions and Quality of life in Patients with and without Lymphedema After Breast Canser Treatment. Yeditepe University, Institute of Health Science, Department of Sports Physiotheraphy, Master Thesis, Istanbul.

This study was conducted with 59 patients with breast cancer who applied to Süleyman Demirel University Research and Practice Hospital, Physical Medicine and Rehabilitation outpatient clinic in order to examine the exercise perceptions of patients who developed and did not develop lymphedema after breast cancer treatment. In our study, the Exercise Benefit/Barriers Scale (EBBS) was applied to all patients in order to determine the exercise perceptions of the patients. Body Awareness Questionnaire was applied to evaluate the body awareness of the patients. The Disability of Arm, Shoulder and Hand Questionnaire (DASH), Shoulder, Pain and Disability Scale (SPADI), normal joint range of motion (ROM) measurement, circumference measurement, and the Lymphedema Quality of Life-Arm (LYMQOL) Scale were used to assess upper extremity functionality.

When the two groups with and without lymphedema were compared, a significant difference was found between the EBBS-Total and EBBS-Benefit values of the groups ($p<0.05$). When the DASH scores of the groups were compared, a significant difference was found between the two groups ($p<0.05$). A significant difference was found between the SPADI-Disability scores of the groups ($p<0.05$). Elbow flexion, supination and wrist joint movements in all directions were lower in the lymphedema group in upper extremity ROM measurements. There is a significant difference between the two groups ($p<0.05$). A weak positive correlation was found between DASH and EBBS in the lymphedema group ($p<0.05$). A moderate positive correlation was found between EBBS and LYMQOL scores ($p<0.05$). LYMQOL-21. There was a moderate negative correlation between the questions ($p<0.05$). A weak negative correlation was found between EBBS and shoulder flexion, wrist extension and radial deviation ($p<0.05$). A moderate positive correlation was found between EBBS and SPADI-Disability scale in the group without lymphedema ($p<0.05$). Conclusion; A moderate correlation was found between exercise perceptions, upper extremity functions and quality of life of patients who developed lymphedema after breast cancer.

Keywords: Breast Cancer, Lymphedema, Exercise Perception, Function, Quality of Life, Body Awareness

ÖZET

Kızılay, M. (2021). Meme Kanseri Tedavisi Sonrası Lenfödem Gelişen ve Gelişmeyen Hastaların Egzersiz Algılarının Üst Ekstremite Fonksiyonları ve Yaşam Kalitesine Etkisi. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Spor Fizyoterapisi Anabilim Dalı, Yüksek Lisans Tezi. Istanbul.

Bu çalışma meme kanseri tedavisi sonrası lenfödem gelişen ve gelişmeyen hastaların egzersiz algılarının incelenmesi amacıyla Süleyman Demirel Üniversitesi Araştırma ve Uygulama Hastanesi Fiziksel Tıp ve Rehabilitasyon polikliniğine başvuran meme kanseri geçirmiş 59 hasta ile yapılmıştır. Çalışmamızda, hastaların egzersiz algılarını belirlemek amacıyla tüm hastalara Egzersiz Yarar/Engel Ölçeği (EBBS) uygulanmıştır. Hastaların vücut farkındalığını değerlendirmek için Vücut Farkındalık Anketi uygulanmıştır. Üst ekstremite fonksiyonelliğini değerlendirmek için Kol, Omuz, El Sorunları Anketi (DASH), Omuz, Ağrı ve Engel Ölçeği (SPADI), normal eklem hareket açıklığı (NEH) ölçümü, çevre ölçümü, yaşam kalitelerini belirlemek için Lenfödem Yaşam Kalite-Kol Ölçeği (LYMQOL) uygulanmıştır. Lenfödem gelişen ve gelişmeyen iki grup karşılaştırıldığında, grupların EBBS-Toplam ve EBBS-Yarar değerleri arasında anlamlı bir fark bulundu ($p<0,05$). Grupların DASH skorları karşılaştırıldığında iki grup arasında anlamlı bir fark bulundu ($p<0,05$). Iki grubun SPADI-Engel skorları arasında anlamlı bir fark bulundu ($p<0,05$). Üst ekstremite NEH ölçümlerinde dirsek fleksiyon, supinasyon ve el bileği ekleminin tüm yönlerdeki hareketlerinin ölçümü lenfödemli grupta daha düşük bulunmuştur. Iki grup arasında anlamlı bir fark vardır ($p<0,05$). Lenfödem gelişen grupta DASH ile EBBS arasında pozitif yönde zayıf bir korelasyon bulunmuştur ($p<0,05$). EBBS ile LYMQOL skorları arasında pozitif yönde orta düzeyde bir korelasyon bulunmuştur ($p<0.05$). LYMQOL-21. soru arasında negatif yönde orta düzeyde bir korelasyon bulunmuştur ($p<0,05$). EBBS ile omuz fleksiyonu, el bileği extansiyonu ve radial deviasyonu arasında negatif yönde zayıf bir korelasyon bulunmuştur ($p<0,05$). Lenfödem gelişmeyen grupta EBBS ile SPADI-Disabilite ölçeği arasında pozitif yönde orta düzey bir korelasyon bulunmuştur ($p<0,05$). Sonuç; Meme kanseri sonrası lenfödem gelişen hastaların egzersiz algıları ile üst ekstremite fonksiyonları ve yaşam kaliteleri arasında orta düzeyde bir ilişkiye rastlanmıştır.

Anahtar Kelimeler: Meme Kanseri, Lenfödem, Egzersiz Algısı, Fonksiyon, Yaşam Kalitesi, Vücut Farkındalığı

1. INTRODUCTION AND PURPOSE

Breast cancer is one of the diseases known in women. Cancer-related incidence and mortality rates, especially breast cancer, have been increasing for the last 50 years (1). Breast cancer is the second most common cause of cancer in all people after lung cancer. It is the most common female cancer in many developed and developing countries (2). Approximately 1 in 4 of all cancer types seen among women constitute breast cancer. Although its incidence is high, especially in develeoped countries, it has been observed that survival rates have been higher in recent years (3).

As a standard, modified radical mastectomy is performed on the patient at an early stage in breast cancer surgery. Breast protective surgery is more preferred recently (4). Breast-conserving surgery and subsequent radiation therapy are close to each other after cancer survival rates compared to mastectomy. Breast-conserving surgery has the highest success rate in early-stage breast cancer. But it is not recommended if the risk of relapse is high in patients. Adjuvant systemic therapy and adiation therapy are required by looking at the condition of the axillary lymph nodes (ALNs). ALN dissection was a standard treatment until the 1990s, but it was found to cause decreased mobility, pain, swelling, and numbness on the affected side. If the lymph node of the patients is not active (negative node), a biopsy of the sentient lymph node (SLN) is performed instead of ALN dissection (4). In patients with SLN positive and in patients with SLN positive after neoadjuvant therapy, SLN biopsy is an adequate treatment alone (5).

Due to the increase in survival time after breast cancer treatments, it has brought health problems in the long term in patients depending on the treatments. Lymphedema was defined as protein-rich interstitial tissue effusion as a result of disruption of the flow of the lymphatic system in patients undergoing breast cancer surgery and radiotherapy (RT) (6). Lymphedema may develop temporarily or permanently in patients with breast cancer who undergo ALN dissection. Permanent development of lymphedema takes an average of 14 months (2-92 months). The number of lymph nodes dissected and radiotherapy to the axillary region increase the risk of lymphedema in patients with breast cancer (7). Ridner et al. the most common symptoms in people who develop lymphedema; reported decreased range of motion (48%), heaviness in the extremities (76.2%), stiffness (65.8%), pain (67.3%), numbness (63.9%) and swelling (96.8%) (8).

Lymphedema is a chronic condition that brings multiple problems and can make life difficult for the individual. As a result, functional losses, cosmetic deformities and psychological disorders may ocur (9). In the literature, different results have been obtained between the severity of lymphedema and the functional status of the upper extremity and quality of life, and this relationship is not fully understood. The reason for the conflicting results in these studies may be that the severity of lymphedema was not reported objectively and there may be different definitions and values for lymphedema. In addition, it was found that upper extremity symptoms reported in a hospital were more closely related to quality of life than objectively measured arm volume (10). Rietman et al. found that physical function, general health and scores of the patients after breast cancer treatment were lower in the group with lymphedema. In the study of Beaulac et al. Investigating lymphedema and quality of life in early stage breast cancer, it was found that lymphedema has a negative relationship with quality of life (11).

During the period following breast cancer treatment, the problems affecting daily life of patients and frequently occurring are those related to upper extremity functions. In a study, it was found that arm and shoulder limitations were between 10-70%, although it varied according to the treatment and diagnosis performed after surgery. In the literature, it has been reported that 10% - 60% of patients experience at least one upper extremity problem (pain, numbness, tingling, stiffness, edema, weakness, reduction in joint space) in 6 months to 3 years after surgery (9).

Exercise is one of the important components in cancer treatment. Cancer patients may provide benefits such as reducing fatigue, increasing muscle strength and flexibility, improving body image and improving quality of life (12). Breast cancer patients who develop lymphedema generally avoid using their arms. This situation causes complications such as limitation of motion in the upper extremity and an increase in edema. As a result, the patient's quality of life decreases (13). While exercise provides many benefits for breast cancer patients, the key to creating an effective personal program for patients is understanding the participants' own perspectives (14).

The aim of this study is to examine the effect of exercise perception on quality of life and upper extremity functions of patients with and without lymphedema who have received breast cancer treatment.

The hypotheses of our study:

H1: Exercise perceptions and upper extremity function levels of women who developed lymphedema after breast cancer surgery were lower than those who did not develop lymphedema.

H2: The exercise perception and upper extremity functions of women who developed lymphedema after breast cancer surgery were higher than those who did not develop lymphedema.

H3: Exercise perceptions and quality of life levels are higher in women who do not develop lymphedema after breast cancer surgery.

H4: Exercise perceptions and body awareness of women with lymphedema after breast cancer surgery are higher than women without lymphedema.

2. GENERAL INFORMATION

2.1. Breast Anatomy

The area where the mammary gland (gl. Mammae) is located on the anterior chest wall is called the breast region (regio mammaria). Its shape varies according to the person, age and physiological conditions. It has an average weight of 150-200 gr (15). In humans, breast tissue consists of fat (the main component that creates size) and connective tissue as well as mammary glands. The mammary glands are subcutaneously localized in the anterior and lateral thoracic wall. Each breast consists of 15-20 lobes, each with many lobules (figure 1.1). The pigmented area surrounding the nipple at the apex of the breast is called the "areola". The breast extends laterally from the lateral edge of the sternum to the mid-armpit line and from top to bottom from the 2nd to the 6th rib. The tail part of the breast called "Spence's tail" extends to the armpit. (16).

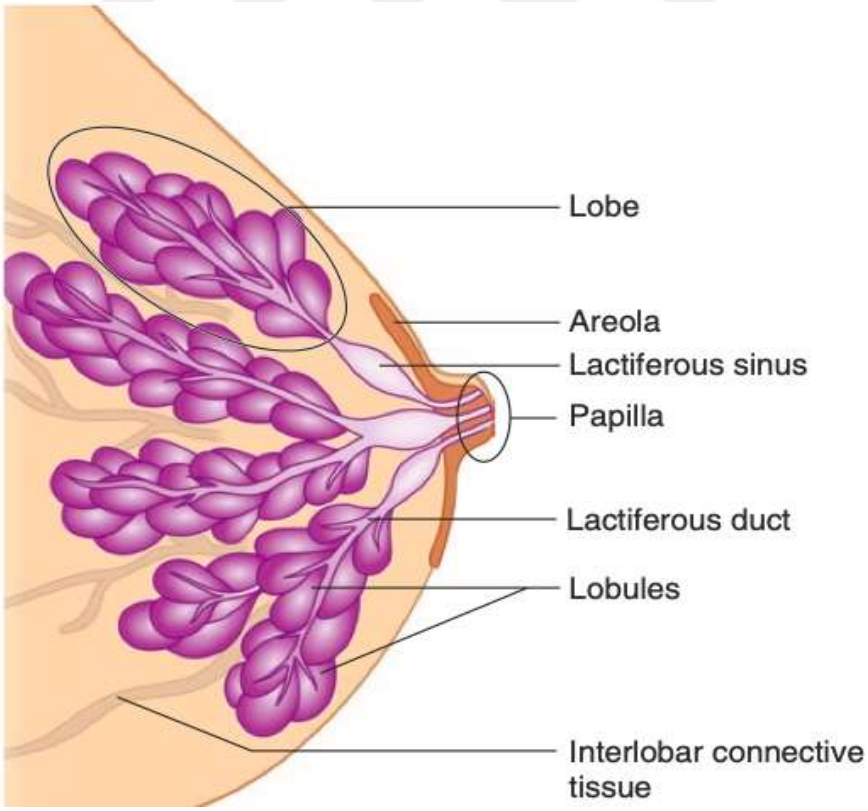


Figure 2.1. Breast Anatomy (17).

The breast is located in the superficial fascia on the anterior chest wall. Fibrous fibers starting from this layer extend to the skin and breast head. These make up the Cooper ligaments. Cooper ligaments are fibrous bands that extend between the skin and the superficial layer of the superficial fascia and surround the breast parenchyma, whose directions are perpendicular to the skin and separate the breast tissue into the septa. Malignant tumors or shortening of fibrous tissue of the Cooper ligaments cause skin withdrawal (Orange peel appearance, Peau D'orange) (18).

2.1.1. Breast Vascular Anatomy

The blood supply of the breast varies according to the periods such as pregnancy and breastfeeding and according to the parenchymal volume of the breast. Postmenopausal women have less blood supply in the nipple than pre-menopausal women (19).

The middle and inner parts of the breast (approximately 60% of the breast) are fed by the anterior perforating branches of the internal mammary artery (lateral branch of the subclavian artery), and the upper outer part (approximately 30% of the breast) and the lateral thoracic artery (branch of the axillary artery) (20).

The veins of the breast also run parallel to their arteries. The largest veins carrying blood from the breast are the perforating branches of the internal thoracic vein at the 1st, 2nd, and 3rd intercostal spaces. A. thoracica has a branch from the lateralis. The veins form the circulus venosus around the papillae mamae. Vessels starting from here. axillaris, v. thoracica interna, and v. carries the intercostalis posterior (20, 21)

The distribution of breast veins determines the trace of metastatic carcinoma emboli and the metastasis pathways (20). Figure 2.2. shows breast vaskular anatomy (22).

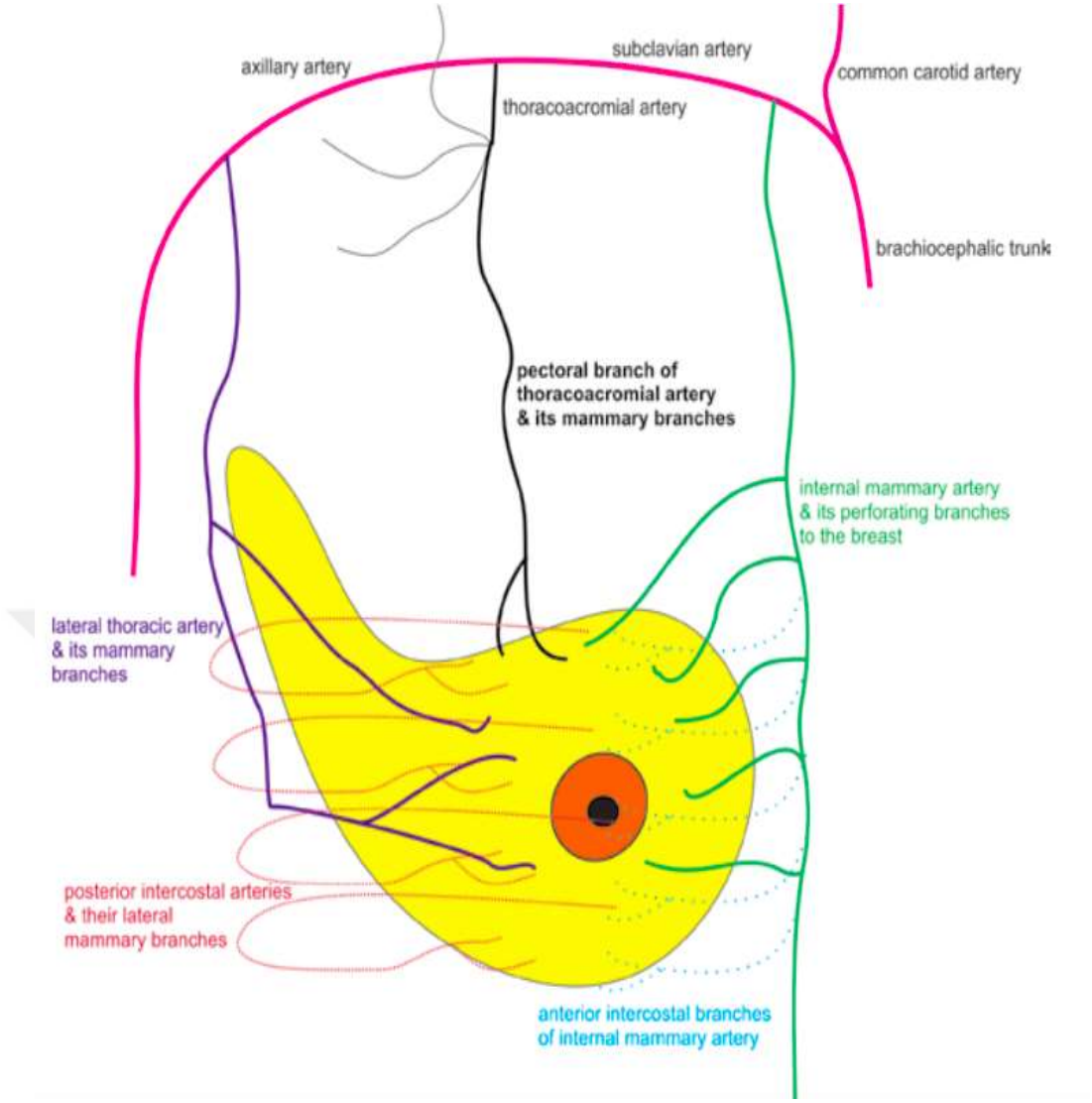


Figure 2.2. Breast Vascular Anatomy (22).

2.1.2. Breast Innervation

Sensory innervation of the breast comes from the lateral and anterior cutaneous branches of the 2nd to 6th intercostal nerves. The 4th intercostal nerve branches innervate the nipple. In addition, the lateral and anterior cutaneous branches of the 2nd, 3rd, and 6th intercostal nerves and the supraclavicular nerves coming from C3 and C4 may innervate the breast (16, 23). Figure 2.3. shows breast innervation (24).

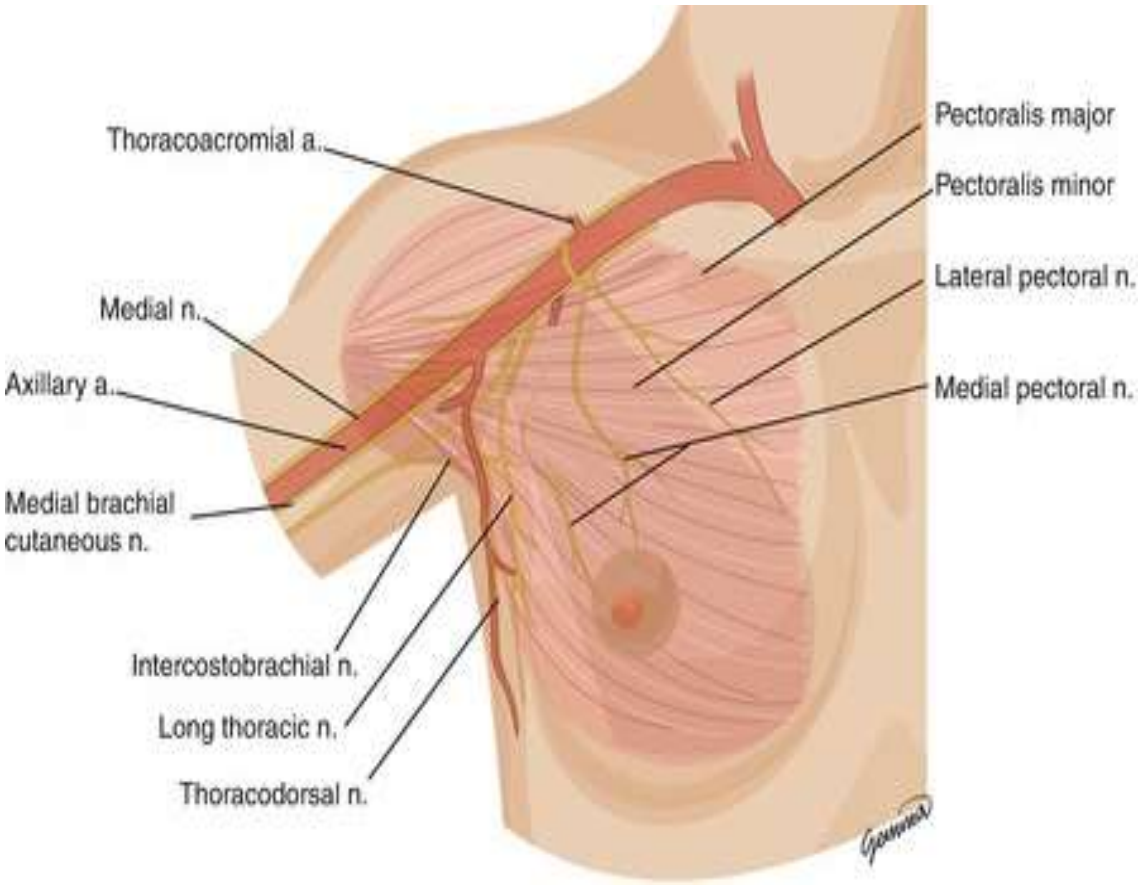


Figure 2.3. Breast Innervation (24).

2.1.3. Lymphatic System of The Breast

Breast lymphatic vessels start from the lymphatic network around the ductus lactifer and in the interlobular septum. Lymphatic vessels from the central part of these regions join another lymphatic network under the areola. The efferent vessels emerging from this network open to the pectoral lymph nodes in the form of two main roots. The lymph vessels draining the lateral and medial part of the breast flow through the parasternal lymph nodes by piercing the chest wall. 75% of the lymph vessels of the breast area are to the axillary lymph nodes; Most of the rest, especially the medial part of the breast, flows into the parasternal lymph nodes (25). Figure 2.4. shows breast lymphatic system (26).

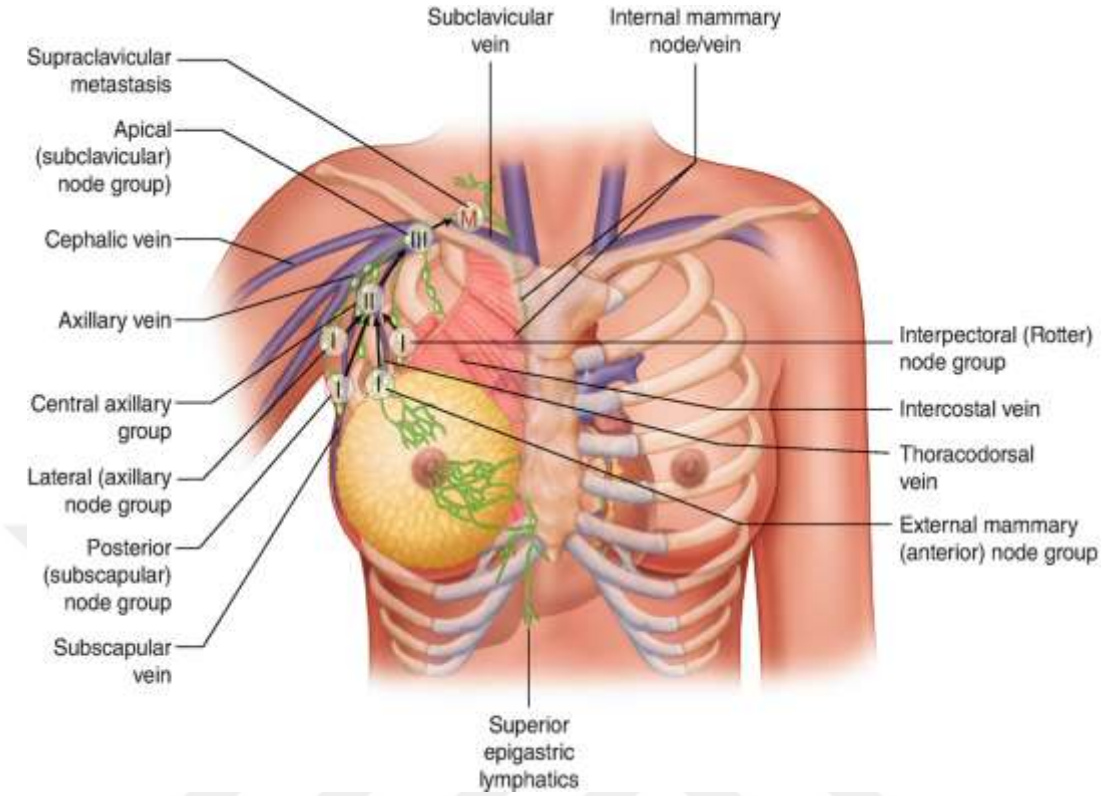


Figure 2.5. Breast lymphatics and veins (26).

2.2. Breast Cancer

2.2.1. Definition, Prevalence and Incidence

Cancer is a group of diseases caused by the irregular and uncontrolled division and proliferation of cells in an organ or tissue in various parts of our body (27).

Breast cancer occurs when breast tissue cells become abnormal due to an effect. Generally, it is in the form of a hard mass (tumor, lump) with irregular borders and wood like. It is a systemic disease that continues to multiply by spreading to the surrounding tissues and organs in other parts of the body with the uncontrolled rapid proliferation of cells in the mammary tissue, milk glands and milk ducts (28).

Ductal carcinoma; It begins in the cells of the ducts and is the most common type of breast cancer. Lobular Carcinoma; Cancer that starts in the lobes or lobules and is

found in both breasts compared to other types of breast cancer. The type of cancer in which the breast is swollen, hot and red is Inflammatory breast cancer. (29).

Breast cancer, which is the most frequently diagnosed cancer among women in the world, ranks first in cancer deaths with 1.7 million cases and 521.900 deaths in 2012. Breast cancer constitutes 25% of all cases of cancer. It accounts for 15% of all cancer deaths among women (30).

The incidence of breast cancer has changed in the last 10 years. In 1975, a wide population screening started. The increase in incidence in 1980 was probably due to the increase in early diagnosis and mammographic screening. Increased screening, use of hormones, and an increase in obesity in the late 1990s may have caused the incidence to increase. The increase that has reached the present day was probably due to factors such as delayed births and decreasing births (31).

2.2.2. Etiology and Risk Factors

The effect of age on breast cancer risk is approximately 8.5% per year from menarche to menopause. After menopause, it will increase by 2.5% per year. This indicates that the impact of risk factors may change before and after the menopause (32).

Hormonal factors and a first-degree relative with a history of lymphedema increase the risk of breast cancer in women. Factors increasing exposure to estrogen; Advanced age in the first pregnancy, early menopause, late menopause increase the risk of breast cancer. Women who have not given birth until the age of 30 are at higher risk than women who have had children before the age of 20. It protects breastfeeding and longer breastfeeding (31).

Risk factors include being obese, weight gain after the age of 18, being overweight, alcohol use and physical inactivity. Radiation is also a known risk factor (30).

2.2.3. Breast Cancer Diagnosis

Although breast cancer is a systemic disease, in order for the systemic disease to become apparent, that is, for metastasis development, the tumor diameter must be larger than 1 cm and there must be axillary lymph node metastasis. Breast cancer is a heterogeneous disease community (33).

There are many studies reporting that the majority of breast cancers are found by women themselves and that breast cancer is detected at an earlier stage in women who perform breast self-examination (34). A woman who does not have additional risk factors for breast cancer should be evaluated by a doctor for the first time at the age of 30-35. Mammography, which is considered to be the most effective screening method in breast cancer screening and has proven its effect on mortality with randomized studies, is known to be a powerful screening method, especially in women aged 50-69. It has been reported that digital mammography is more sensitive in young women and those with dense breast tissue, but studies on this subject are insufficient (33,34).

2.2.4. Breast Cancer Treatment

Surgery, cytotoxic drugs, radiation therapy and endocrine drugs are the primary treatment modalities for breast cancer. Treatments can be classified as systemic or local (nodal or metastatic involvement). Factors in treatment selection; the stage of the disease, the presence of progesterone / estrogen receptors, tumor characteristics and menopausal status (35).

2.2.4.1. Breast Cancer Surgery

Today, Modified Radical Mastectomy (MRM) and Breast-Conserving Surgery (BCS) methods are frequently used in breast cancer surgery (36).

2.2.4.1.1. Mastectomy

In the 1970s, Modified Radical Mastectomy (MRM) became the gold standard for stage 1 and 2 breast cancer patients (37). However, over time, the indications for comprehensive surgical intervention decreased. Today, 40% of all women undergo mastectomy due to breast cancer. Mastectomy is currently developed to be mostly breast-conserving surgery (38).

-Simple Mastectomy: While the entire breast is removed, the underlying muscle tissue and armpit lymph nodes are not removed. In some cases, breast skin is left for breast reconstruction (breast - conversing mastectomy). Sentinel lymph node biopsy may be performed or it may not need to be performed according to the type of cancer (39).

-Radical Mastectomy: In this large-scale operation, the entire breast, underarm lymph nodes and pectoral muscles under the breast are removed. Radical mastectomy is a method used frequently in the past. Nowadays, radical mastectomy is a less common method and is mostly applied for large tumors in the pectoral (chest wall) muscles under the breast (39).

-Modified Radical Mastectomy: With this method, underarm lymph nodes are removed during simple mastectomy (39).

2.2.4.1.2. Breast-Conserving Surgery

Breast Conserving Surgery (BCS) with partial mastectomy and adjuvant radiotherapy is a well-established surgery for the 1st stage of breast cancer. BCS local recurrence and survival are equally effective as large total mastectomy (40). BCS is also known as lumpectomy, partial lumpectomy, segmental mastectomy or quadrantectomy. In this surgery, a part of the breast known to be cancerous is removed. The removed breast piece usually includes the tumor-associated mammary gland and some surrounding tissue. The amount of tissue to be removed is determined by factors such as the size of the cancer and the area it has spread. After lumpectomy surgery, it is recommended that most of the patients receive radiotherapy in case there is cancerous tissue left (41).

2.2.4.2. Radiotherapy

Radiotherapy is used in addition to surgery in breast cancer. The purpose of this; to control metastasis and inhibit the growth of cancer cells. It is generally applied in patients at high risk of recurrence. (35).

After mastectomy, radiotherapy is applied in cases where the diameter is 5 cm or larger than 5 cm, the tumor has extracapsular spread in the lymph nodes, axillary lymph node involvement is more than four, or it invades the chest wall. (42)

2.2.4.3. Systemic Treatment

Primary systemic therapy is increasingly used in patients with early stage breast cancer (43). Systemic therapy includes endocrine, cytotoxic and biological agents (44).

2.2.4.3.1. Chemotherapy

It is the main treatment for advanced breast cancer. The aim of chemotherapy is to increase survival time, reduce complications and symptoms. In addition, the toxic effects of chemotherapy cause a variety of symptoms. The most common of these symptoms are nausea, fatigue, vomiting, hair loss, diarrhea, and neuropathy (45).

2.2.4.3.2. Hormonal Therapy

Hormonal therapy, indicated in all stages of breast cancer, is a suitable treatment for progesterone or estrogen-containing types. Endocrine therapy applied to metastatic disease increases survival and shrinks the tumor (20-40% of patients) (46). Endocrine therapy is important in the early stage of breast cancer in the post-premenopausal period. Tamoxifen has been the main adjuvant treatment in breast cancer patients with positive hormone receptors (47).

2.3. Breast Cancer Related Lymphedema

Lymphedema is a condition that occurs as a result of lymphatic dysfunction, characterized by abnormal accumulation of protein-rich fluid and permanent swelling in the extremity. There are three mechanisms that explain lymphatic pathophysiology. These are obstruction, reflux and overproduction of lymph fluid. Although lymphedema can be seen in both genders and at any age, it is more common in women. It is usually one-sided. It is divided into primary and secondary lymphedema according to etiology (48).

Swelling may occur in the arm after breast cancer treatment as a result of surgery and radiation treatments. Lymphedema may also develop in the trunk area (i.e. breast,

anterior and posterior chest) on the same side with surgery. The majority of secondary lymphedema patients are breast cancer patients (49, 50). Edema that develops in the first year after surgery is usually temporary. This swelling may be a result of surgery or other treatment-related factors such as chemotherapy. Women with transient lymphedema have more problems due to increased symptoms compared to those who do not. These symptoms are discomfort / pain, swelling, heaviness, and tightness. In women with permanent lymphedema, lymphedema can affect both arm volume and body composition. Cutaneous thickening, hypercellularity and progressive fibrosis occur due to increased edema in the affected area (50).

It is estimated that breast cancer-related lymphedema (BCRL) is seen in approximately 6-30% of women. In a study investigating the incidence of lymphedema, it was stated that the symptoms of lymphedema could be seen immediately after surgery or even 30 years after surgery. In a long-term prospective study published, it was found that 42% of all breast cancer patients had lymphedema in the first 5 years of treatment; In another long-term prospective study, it was noted that the incidence of lymphedema in the first 3 years was between 15-54%. In another twenty-year long-term study, it was stated that 77% of the patients developed BCRL in the first 3 years, and there was a 1% risk of lymphedema per year in the remaining patients (51).

2.3.1. Classification of Breast Cancer Related Lymphedema

The International Society of Lymphology has staged lymphedema in 4 stages with its "consensus document". In addition, 'personalized' staging continues to be used in many countries.

Staging according to the ‘consensus document’ of the International Society of Lymphology (50);

Stage 0: There are changes in the lymphatic system, but there is no visible edema. The patient may talk about the feeling of heaviness or discomfort in the extremity at this stage. It can be defined as the latent or subclinical period.

Stage 1: In this stage, whose protein content is more than venous edema, it leaves edema. Edema decreases with the elevation of the extremity.

Stage 2: There is swelling that does not improve with elevation, and after the development of fibrosis in the tissue, there is an edema that does not go away.

Stage 3: During this period, which is called the lymphatic elepantisis stage, trophic changes such as fibrosis, hyperkeratosis, hyperpigmentation and ulceration occur in the skin.

Other studies evaluated lymphedema according to the healthy side and the circumference measurements on the affected side. A difference of less than 2 cm between the two limbs is considered mild lymphedema, a difference of 2-4 cm as moderate lymphedema, and a difference of more than 4 cm as severe lymphedema (49).

2.3.2. Breast Cancer Related Lymphedema Diagnosis

The earlier the treatment of the disease is started, the better for the success of the treatment and the lower the risk of complications. Early diagnosis is important for lymphedema. If lymphedema is not intervened, it can cause soft tissue swelling, fibrosis, neurological changes (pain, paresthesia) or infection (51). There is no universally accepted "gold standard" or single diagnostic criterion in lymphedema (52).

Cutaneous fibrosis, subcutaneous fibrosis, Stemmer sign are evaluated to distinguish lymphedema from chronic limb edema. In the simple diagnosis of LÖ; Attention is paid to clinical features such as unilateral or asymmetric edema, painless, normal skin color, positive Stemmer sign, intensity of edema, swelling in the dorsum of the hand or foot (51).

Radiographic diagnostic methods have improved significantly for the diagnosis and treatment of lymphedema. Today, the lymphatic system can be visualized with special techniques. These techniques are; indirect lymphography, direct lymphography, lymphoscintigraphy, magnetic resonance imaging, and computed tomography. In the last decade, various noninvasive and minimally invasive tests have been developed to better evaluate the progression of lymphedema, the most common of which is lymphangioscintigraphy (51,52).

2.3.3. Evaluation in Breast Cancer Related Lymphedema

It is important to diagnose lymphedema at the right time. As soon as the diagnosis is made, it requires treatment in a correct process. Managing the early treatment of lymphedema is drastically different from later treatment management. Lymphedema is chronic and requires constant care (52).

The diagnosis of lymphedema is possible with a detailed history and a detailed physical examination. To evaluate the patient presenting with edema in his extremity after breast cancer treatment (surgery and / or radiotherapy); It includes history, physical tests (inspection, palpation, volume and circumferential measurements), questioning of the possibility of metastasis and deep vein thrombosis (51, 53).

Anamnesis: The onset, the triggering factor, the history of its existence, medical and surgical history, and the number of lymph nodes removed are questioned. In addition, the symptoms that the patient may feel should be evaluated within the scope of the history. Patients with LA generally report a feeling of heaviness in their arms or legs, no severe pain, and discomfort in their extremities (51).

Inspection: Localization of lymphedema, skin changes (skin color, ulcer, papillomas, skin folds, hyperemia, intertrigo), skin folds, scar / incision structure (transverse incisions negatively affect lymph flow), patient's expression, posture and muscle atrophies are observed. It should be taken into consideration during inspection that there will be unilateral or asymmetrical swelling in lymphedema and the skin color will generally be normal. Skin wound, eruptions and leaking skin changes (lymphorrhea) should also be recorded (51, 53).

Palpation: Skin mobility, tissue density, consistency and pitting of edema, presence of fibrosis, skin temperature, tenderness, muscle tone, and sensation of the affected limb are examined. In addition, the Stemmer sign, which is a clinical test for LÖ and evaluates subcutaneous edema, is looked at. For this, the patient's hand or foot 2nd and 3rd finger tissue is taken between the two fingers by the clinician and the skin thickness is evaluated. If the skin on the back of the toes or fingers cannot be lifted easily, this is called a positive Stemmer sign. If this sign is positive; It indicates that there is fibrosis in the skin and lymphedema at least stage 2. A negative Stemmer sign

does not completely exclude the diagnosis of lymphedema. In this case, other findings should also be considered (51, 53).

When pressure is applied to the edematous area, especially on the distal parts of the extremity, with the finger for a while, a pitting (gode) occurs in the area where the pressure is applied, and this pitting continues for a while when the pressure is removed. Lymphedema is not a specific finding, it can be observed in other types of edema. However, it is clinically valuable in terms of providing information about skin changes and the prognosis of edema in patients with lymphedema (54).

Volume Measurements: Measurement of the amount of water displacement (volumetric measurement), bioimpedance, infrared optoelectric evaluation (perometer) are volume measurement methods in lymphedema (51).

- Water Displacement Method: The patient is asked to immerse his limb in a cylindrical container filled with water. The amount of water displaced is recorded in milliliters (mL). The difference between unaffected and affected limbs is noted. While some researchers interpret the difference of more than 200 mL as positive diagnosis, some researchers interpret the difference of more than 10% as positive for the test (51).

- Bioelectrical İmpedance Spectrometry (Bis): It measures the impedance of body tissues. The method frequently used in body composition analysis allows direct measurement of changes in edema volume. It is a fast, inexpensive method that can measure both bilateral and unilateral edema of the extremities. This method is reliable and reproducible. It has shown that it is an accurate method for monitoring lymphedema with breast cancer (53,55).

- Perometry: It uses a frame of infrared light beam-receiver pairs to measure limb volume using the disk model method (56).

- Circumferential Measurements: It is the circumferential measurement of the extremities with the help of a tape measure. The difference between affected and unaffected extremities is used to evaluate edema. There are two most commonly used methods, but they have no standardization (51). There are many measurements for circumference measurement. The National Lymphedema Network (NLN) recommended that measurements should be made from six points. They determined the

measurement points as 10 cm distal and proximal to the lateral epicondyle in both arms, just below the axilla, hand, wrist and elbow. These points should be determined by measuring 4 cm intervals from the ulnar styloid to the axilla by the International Society of Lymphology. The truncated cone model can be used to calculate the total arm volume. (56).

2.4. Exercise Perception

There are two variables consistently stated in studies to determine the physical activity levels of individuals. These; perceived benefits and perceived barriers. Perceived benefit is expressed as the gains of individuals as a result of activity (eg, increase in muscle strength). Perceived barriers, on the other hand, are barriers that hinder the individual in health behavior (eg, fatigue) (57). Knobf defined symptoms (fatigue, pain) associated with mastectomy, chemotherapy (weight gain, nausea, vomiting, hair loss) and radiation therapy (chest pain), which are components of breast cancer treatment, as an obstacle to physical activity for women with breast cancer. should be considered as a barrier to physical activity in women (58).

2.4.1. Perceived Benefits and Barriers to Physical Activity Within the Context of the Social Cognitive Theory

Social Cognitive Theory (SCT) is one of the most widely used to increase participation in physical activity. The theory was first developed by Bandura in 1970. The most striking aspect of this theory is that it defines a continuous dynamic relationship between the individual's behavior, cognition and the environment. This is called the principle of mutual determinism.

In the SCT, the expected benefits (positive outcomes) of a behavior were defined as the perceived benefits. The factors that make it difficult to perform the behavior are defined as perceived barriers. Perceived barriers are also associated with negative outcome expectations. A better understanding of the perceived barriers and benefits of low-activity groups in cancer survivors is needed to continue their physical activity (57).

3. MATERIALS AND METHODS

3.1. Research Design

3.1.1. Subject

The study was conducted to investigate the effect of exercise perception on upper extremity functions and quality of life in women with and without lymphedema after breast cancer treatment.

3.1.2. Procedure

The research is cross-sectional and prospective.

The study was carried out in Süleyman Demirel University Education and Research Hospital, Physical Medicine Department, Physical Therapy Lymphedema Unit.

Ethics committee approval was obtained for the study from the Süleyman Demirel University Clinical Research and Ethics Committee with the letter numbered 72867572-0.50.01.04-32981 and the decision number 3.02.2021/60 (Annex-1).

An evaluation was made in two groups, including 30 patients with lymphedema and 29 patients without lymphedema. In total, 59 patients were evaluated.

Patients who volunteered for the study signed an informed consent form. Afterward, the patients were evaluated for approximately 40-45 minutes. First, sociodemographic information about age, height, weight, educational status, and the duration of cancer treatment and detailed medical histories were recorded. The range of motion of the shoulder, elbow, and wrist joints of the patients and the circumference of the upper extremities on both sides were measured by the researcher, and the patients were asked to fill out the questionnaires.

The patients who had undergone breast cancer treatment were divided into two groups as those with and without lymphedema. The lymphedema criteria are primarily based on a comparison between the risky/bulging and contralateral arm. A difference of 2 cm or more than 2 cm in the circumference measurement of the two arms indicates the

presence of lymphedema (54). If the difference between the two arms is 2 cm or more, patients are considered to have lymphedema.

The inclusion criteria were as follows:

- Being over 18 years old
- Patients who had been treated for breast cancer
- Having a diagnosis of unilateral upper extremity lymphedema
- Obtaining the informed consent form from the patient

The exclusion criteria were as follows:

- Having active metastatic disease
- The presence of infection in the affected extremity
- The presence of previous orthopedic problems on the side of lymphedema
- Having any neurological problems

3.2. Methods

3.2.1. Evaluation of the Demographic Characteristics of the Participants

Evaluations were made face-to-face. First of all, the patients' sex, age, weight, body mass index, the duration of cancer treatment, and their dominant side were questioned. Then, it was questioned how many years the lymphedema had been present in the lymphedema group and whether they had an orthopedic disease on the lymphedema side. The presence of neurological disease or active metastatic conditions in both groups was questioned.

3.2.2. Exercise Perception Assessment

3.2.2.1. Exercise Benefits/Barriers Scale (EBBS)

The scale consists of 43 items in total. The scale has 4 answers from 4 (strongly agree) to 1 (strongly disagree) in the conditional choice Likert scale format. The total score of the scale varies between 43-172. The scale has two subgroups: the Exercise Barriers Scale and the Exercise Benefits Scale. Each subgroup can be used

independently. The score range of the Benefits Scale is between 29-116, and the score range of the Barriers Scale is between 14-56. The sum of all items in the scale gives the Exercise Benefits/Barriers Scale total score. The higher the total score is, the more the individual understands the benefits of exercise. The validity and reliability studies of this scale in Turkey were conducted by Ortabağ, Ceylan, Akyüz, and Bebiş, and Cronbach's alpha coefficient was determined as 0.95 (60).

3.2.3. Upper Extremity Circumference Measurement

In upper extremity lymphedema, the circumference is measured every 4 cm from the wrist to the axilla. Then, the volume calculation is made using the truncated formula. The lymphedema side is compared with the contralateral healthy extremity (53).

The truncated formula: $V=1/3x\pi xhx(r1^2 +r2^2 +r1xr2)$.

There is also an Excel® formula for the volume measurement (Table 1).

Table 1. Cone Formula in the Excel Program for Volume Measurements (52).

	Right limb circumference (cm)	Left limb circumference (cm)	
1	17.7	15.9	Wrist End
2	20.7	17	
3	23.1	20	
4	26.2	23.6	
5	27.7	25	
6	27.5	25.8	
7	28	25.5	
8	30.8	26.2	
9	31	29	
10	31.2	30.1	
11	32.7	31.8	Shoulder end

	Right Limb	**Left Limb**
Volume at the first visit (mls)		
Today's volume (mls)	2.395	1.988
Absolute volume change since the first visit (mls)	Not known	Not known
Comparing both of today's limb volumes		
Volume difference between both limbs today (mls)	407	
Volume difference between both limbs today, using a smaller volume as the reference volume (%)	20,5	

3.2.4. Assessment of the Upper Extremity Range of Motion

A universal goniometer (UG) was used to evaluate the joint range of motion (ROM) of the upper extremity. Passive and active shoulder flexion, shoulder extension, shoulder internal and external rotation movements, elbow flexion, extension, pronation and supination movements, wrist flexion, extension, radial and ulnar deviation movements of the subjects in the supine position were measured in degrees using a goniometer. The difference between the measurement values of the right and left arm was taken to determine the ROM limitation (60).

3.2.5. Assessment of Upper Extremity Functions

3.2.5.1. Disabilities of the Arm, Shoulder and Hand (DASH) Questionnaire

The DASH questionnaire consists of 3 parts. The first part consists of 30 questions, including 21 questions about the patient's difficulties during activities of daily living, 5 questions about symptoms, and the remaining 4 questions about social function, work, sleep, and self-confidence of the patient. The first part determines the patient's symptom-of-function (DASH-FS) score. In addition to the first part, there is an optional 4-question business model (DASH-W) and sports-musicians model (DASH-SM). According to Likert's system, the patient marks the appropriate answer (1: no difficulty, 2: mild difficulty, 3: moderate difficulty, 4: extreme difficulty, 5: not doing anything at all) (61).

3.2.5.2. Shoulder Pain and Disability Index (SPADI)

In this scale, which consists of two parts, the pain score in the first part and the disability score in the second part were determined, and the total score was obtained by summing the scores of both parts. The pain section consists of 5 questions describing the patient's pain. The disability section, which determines functional activity, consists of eight questions that determine the extent of difficulties during activities that require using the upper extremity. The patients answered each of the questions on a 0-10 cm Visual Analogue Scale chart. The resulting scores for all items were then used to calculate the interrogation score from 0 (no pain/disability) to 100 (very severe pain/disability) (62).

3.2.6. Lymphedema Quality of Life Tool (LYMQOL)

It is a disease-specific, valid and reliable questionnaire developed by Keeley et al. to evaluate the effect of lymphedema on quality of life (Cronbach's alpha=0.83–0.88). The LYMQOL evaluates the effect of arm and leg edema on quality of life using separate questionnaires. It consists of 4 subscales: function, appearance, symptom, and mood. The score of each item ranges from 1 to 4 (1 = not at all, 2 = a little, 3 = a lot, 4 = a lot). The score of each scale is calculated by dividing the total score by the number of

items and ranges from 1 to 4. It is concluded that the higher the score is, the more the quality of life is affected. Bakar et al. reported that the Turkish version of this questionnaire was valid and reliable in patients with breast cancer-related lymphedema (Cronbach's alpha=0.70–0.94) (10).

3.2.7. Assessment of Body Awareness

The Body Awareness Questionnaire (BAQ) was developed by Shields, Mallory, and Simon in 1989 to determine the normal and abnormal sensitivity of the body. It consists of four subgroups and a total of 18 statements. The sleep-wake cycle consists of sub-headings such as predicting body responses, predicting the onset of illness, paying attention to changes in body process responses. Each statement is numbered one through seven (1= not at all true for me, 7= totally true for me). The score of the questionnaire is determined by summing up all the scores. The highest score is 126, and the lowest score is 18. The higher the score obtained from the questionnaire is, the higher the body awareness is (63).

3.3. Data Analysis

All statistical analyses were conducted using Statistical Package for the Social Sciences (SPSS) 20.0 (SPSS Inc, Chicago, IL, USA). The Kolmogorov-Smirnov test and Shapiro-Wilk's test were used to show whether the variables were normally distributed or not. Categorical variables are presented as number and percentage, and continuous variables are presented as mean and standard deviation (SD) if normally distributed and as median and interquartile range (IQR) if not normally distributed.

4. RESULTS

This study was conducted to determine the exercise perceptions of patients with and without lymphedema after breast cancer treatment and determine the effect of exercise perceptions on upper extremity functions and quality of life. 30 who developed lymphedema (age: 53-68, BMI: 22.77- 36.89) and 29 women who did not develop lymphedema (age: 45-66, BMI: 24.34-35.99) were included in the study.

A significant difference was found between the height in the groups ($p<0.05$) (Table 2).

Table 2. Characteristics of the participants

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
Age (years)	57 (45-66)	58 (53-68)	-1.20	0.230
Weight (kg)	75 (63-90)	70.50 (55-90)	-1.64	0.099
Height (cm)	165 (157-170)	160 (155-168)	-2.18	0.029*
BMI (kg/cm^2)	27.31 (24.34-35.99)	26.99 (22.77-36-89	-0.72	0.467
Education Level (years)	12 (4-16)	8 (4-12)	-1.29	0.197

n: Number of individuals, kg; kilograms, cm: centimeters, kg/cm²: kilograms/square meter, IQR: Interquartile Range, BMI; Body Mass Index, $^{\phi}$; Mann-Whitney U Test, *p<0.05

The EBBS results of the groups were compared, and a significant difference was revealed between the EBBS-Benefits and the total EBBS scores ($p<0.05$). No

significant difference was found between the EBBS-Barriers scores of the groups (p>0.05). (Table 3).

Table 3. Comparison of EBBS score between two groups.

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
EBBS-Benefits	54 (33-78)	60.5 (49-80)	-1.89	0.040*
EBBS-Barriers	22 (18-31)	24 (20-32)	-1.38	0.167
EBBS-Total	75 (55-98)	86 (69-108)	-2.08	0.037*

n: Number of individuals, EBSS: Exercise Benefits/Barriers Scale, IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

A significant difference was determined between the DASH scores of the two groups with and without lymphedema (p<0.05) (Table 4).

Table 4. DASH scores of the two groups with and without lymphedema

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
DASH	13.30 (4.10-37.5)	29.15 (11.6-55)	-3.39	0.001*

n: Number of individuals, DASH: The disabilities of the arm, shoulder and hand, , IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

There was no significant difference between the groups in SPADI-Pain and SPADI-Total values (p>0.05). A significant difference was found between the two groups in SPADI-Disability values (p<0.05) (Table 5.)

Table 5. Comparison of the SPADI scores between the groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
SPADI-Pain	8 (4-54)	14 (2-40)	-0.357	0.721
SPADI-Disability	3.75 (0-31.20)	8.7 (2.5-37.50)	-1.961	0.040*
SPADI-Total	6.90 (0.7-38.40)	11.10 (2.30-40.0)	-1.275	0.202

n: Number of individuals, SPADI: Shoulder pain and disability index, , IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

A significant difference was determined between the two groups in terms of the volume differences (p<0.05) (Table 6).

Table 6. Volume differences between the two groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
Volume Difference (ml)	51 (19-103)	490 (271-960)	-6.580	0.001*
Volume Difference (%)	2.50 (0.70-5.20)	23.40 (14.50-63.10)	-6.597	0.001*

n: Number of individuals, ml: milliliter, %: percent, IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

No significant difference was found between the groups in terms of the LYMQOL (p>0.05) (Table 7).

Table 7. LYMQOL-Arm comparison between the groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
LYMQOL-Arm	7.7 (6.6-10.6)	7.5 (7-10)	-.1.38	0.165
LYMQOL-21	9 (7-9)	7.50 (7-9)	-1.426	0.154

n: Number of individuals, LYMQOL: Lymphedema Quality of Life Tool, IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

No significant difference was determined between the body awareness scores of the two groups (p>0.05) (Table 8).

Table 8. Comparison of the body awareness scores of the two groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
Body Awareness	107 (91-120	105 (97-118)	-0.288	0.773

n: Number of individuals, IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

When comparing the shoulder joint range of motion of the groups, no significant difference was found between the two groups (p>0.05) (Table 9).

Table 9. Comparison of the shoulder joint range of motion of the groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
Shoulder Joint				
Flexion (Active)	150 (140-180)	160 (140-180)	-0.138	0.890
Flexion (Passive)	170 (160-180)	170 (140-180)	-0.024	0.981
Abduction (Active)	170 (130-180)	167.5 (120-180)	-0.046	0.963
Abduction (Passive)	180 (155-180)	175 (140-180)	-0.155	0.877
Extension (Active)	45 (25-45)	40 (30-45)	-1.452	0.146
Extension (Passive)	45 (45-45)	45 (30-45)	-1.113	0.256
Internal Rotation (Active)	90 (90-90)	75 (90-90)	-0.437	0.662
Internal Rotation (Passive)	90 (90-90)	90 (90-90)	-0.765	0.444
External Rotation (Active)	70 (60-90)	75 (70-90)	-0.437	0.662
External Rotation (Passive)	80 (70-90)	80 (80-90)	-0.047	0.962

IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

In the evaluation of the elbow joint, a significant difference was found in the active and passive flexion and passive pronation measurements ($p<0.05$). There was no significant difference between the two groups in the remaining measurements of the elbow joint (active supination, active and passive pronation) ($p>0.05$) (Table 10).

Table 10. Elbow joint assessment

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p**
Elbow Joint				
Flexion (Active)	145 (145-145)	137 (130-145)	-2.95	0.003*
Flexion (Passive)	145 (145-145)	145 (140-145)	-3.44	0.001*
Supination (Active)	90 (90-90)	90 (90-90)	-0.424	0.672
Supination (Passive)	90 (90-90)	80 (90-90)	-2.59	0.009*
Pronation (Active)	90 (90-90)	90 (90-90)	-1.71	0.087
Pronation (Passive)	90 (90-90)	80 (90-90)	-1.15	0.250

IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *$p<0.05$

In the evaluation of the wrist joint movements of both groups, all movements of the wrist (flexion, extension, ulnar and radial deviation) were evaluated as active and passive, and a significant difference was determined between wrist joint movements ($p<0.05$) (Table 11).

Table 11. Evaluation of the wrist joint movements of both groups

	Patients without Lymphedema (n=29) Median (IQR)	**Patients with Lymphedema (n=30) Median (IQR)**	**z**	**p$^{\phi}$**
Wrist Joint				
Flexion (Active)	90 (90-90)	90(85-90)	-2.533	0.011*
Flexion (Passive)	90 (90-90)	90 (85-90)	-2.533	0.011*
Extension (Active)	70 (70-70)	70 (60-70)	-1.991	0.047*
Extension (Passive)	70 (70-70)	70 (70-70)	-2.018	0.044*
Ulnar Deviation	20 (20-20)	20 (20-20)	-2.019	0.043*
Radial Deviation	45 (45-45)	45 (45-45)	-3.188	0.001*

IQR; Interquartile Range, $^{\phi}$; Mann-Whitney U Test, *p<0.05

The relationship between EBBS and other parameters was compared in women with lymphedema. A weak positive correlation was found between EBBS and DASH (p<0.05). A moderate positive correlation was found EBBS and LMYQOL scores (p<0.05). A moderate negative correlation was found between EBBS and LYMQOL-21 scores (p<0.05). No correlation was found between SPADI, Body Awareness and Volume Differences and EBBS (p>0,05) (Table 12).

Table 12. Relationship of the EBBS with other clinical parameters in women with lymphedema

	EBBS TOTAL	
	r	**p^{γ}**
DASH	0.367	0.046*
LYMQOL	0.435	0.016*
LYMQOL-21	-0.504	0.004*
SPADI-Pain	0.071	0.709
SPADI-Disability	0.278	0.137
SPADI-Total	0.172	0.362
Body Awareness	-0.271	0.147
Volume Differences (ml)	-0.107	0.574
Volume Differences (%)	-0.002	0.993

DASH: The disability of arm, shoulder and hand, LYMQOL: Lymphedema quality of life tool, LYMQOL-21:Lymphedema quality of life tool 21st question, SPADI: Shoulder pain and disability scale, ml: mililiter, %: percent; γ; Spearman correlation test, *p<0.05

The relationship between EBBS and range of motion in women with lymphedema was investigated. A weak negative correlation was found between EBBS and active and passive flexion in shoulder joint movement (p<0.05). In addition, a weak negative correlation was found between EBBS and passive extension, radial deviation angles in the wrist joint (p<0.05) No correlation was found between abduction, internal and external rotation range of motion of the shoulder joint and EBBS (p>0,05). No correlation was found between the range of motion of the elbow joint and EBBS (p>0,05). No relationship was found between wrist flexion, extension (active) and ulnar deviation range of motion values and EBBS (p>0,05) (Table 13).

Tablo 13. The relationship of EBBS with range of motion in Patients with lymphedema

	EBBS TOTAL	
	r	**p$^{\gamma}$**
Shoulder Joint		
Flexion (Active)	-0.392	0.032*
Flexion (Passive)	-0.376	0.041*
Abduction (Active)	-0.324	0.081
Abduction (Passive)	-0.198	0.293
Extension (Active)	-0.299	0.109
Extension (Passive)	-0.187	0.321
Internal Rotation (Active)	-0.259	0.168
Internal Rotation (Passive)	-0.262	0.163
External Rotation (Active)	-0.302	0.104
External Rotation (Passive)	-0.243	0.196
Elbow Joint		
Flexion (Active)	-0.100	0.598
Flexion (Passive)	-0.215	0.253
Supination (Active)	-0.151	0.425
Supination (Passive)	0.40	0.833
Pronation (Active)	-0.005	0.981
Pronation (Passive)	-0.229	0.223
Wrist Joint		
Flexion (Active)	-0.245	0.192
Flexion (Passive)	-0.245	0.192
Extension (Active)	-0.127	0.504
Extension (Passive)	-0.379	0.039*
Ulnar Deviation	-0.347	0.060
Radial Deviation	-0.391	0.033*

γ; Spearman correlation test, *p<0.05

We compared the EBBS-Total values of the group without lymphedema with other parameters. A positive correlation was found between EBBS-Total values and SPADI-Disability scale scores ($p<0.05$). When we compared the EBBS value with other parameters, no significant relationship was found between DASH, LYMQOL, SPADI-Pain and SPADI-Total, Body Awareness and volume differences ($p<0,05$) (Table 14).

Table 14. Relationship of EBBS with other clinical parameters in people without lymphedema

	EBBS TOPLAM	
	r	**p^{γ}**
DASH	0.348	0.064
LYMQOL	0.241	0.208
LYMQOL-21	-0.310	0.102
SPADI-Pain	0.168	0.384
SPADI-Disability	0.532	0.003*
SPADI	0.317	0.094
Body Awareness	-0.254	0.184
Volum Differences (ml)	0.008	0.966
Volum Differences (%)	0.048	0.805

DASH: The disability of arm, shoulder and hand, LYMQOL: Lymphedema quality of life tool, LYMQOL-21:Lymphedema quality of life tool 21st question, SPADI: Shoulder pain and disability scale, ml: mililiter, %: percent; γ; Spearman correlation test, *p<0.05

We did not find a correlation between EBBS-total scores and upper extremity range of motion values in the group without lymphedema (Table 15).

Tablo 15. The relationship of EBBS with range of motion in Patients without lymphedema

	EBBS TOPLAM	
	r	**p$^{\gamma}$**
Shoulder Joint		
Flexion (Active)	-0.261	0.171
Flexion (Passive)	-0.211	0.271
Abduction (Active)	0.257	0.179
Abduction (Passive)	-0.177	0.358
Extension (Active)	-0.097	0.618
Extension (Passive)	0.083	0.667
Internal Rotation (Active)	-0.180	0.350
Internal Rotation (Passive)	-0.120	0.535
External Rotation (Active)	-0.226	0239
External Rotation (Passive)	-0.246	0.198
Elbow Joint		
Flexiyon (Active)	-0.060	0.759
Flexion (Passive)	-0.315	0.095
Supination (Active)	0.001	0.998
Supination (Passive)	-0.061	0.753
Pronation (Active)	0.001	0.981
Pronation (Passive)	0.171	0.376
Wrist Joint		
Flexion (Active)	-0.079	0.683
Flexion (Pasive)	-0.079	0.683
Extension (Active)	-0.127	0.504
Extension (Pasive)	0.185	0.336
Ulnar Deviation	0.109	0.572
Radial Deviation	0.221	0.214

γ; Spearman correlation test, *p<0.05

5. DISCUSSION

Our study was conducted to investigate the effect of exercise perceptions on upper extremity functions and quality of life of women with or without lymphedema after breast cancer treatment.

In our study, a significant difference was found between the EBBS-Benefits, EBBS-total and DASH scores of the two groups with and without lymphedema ($p<0.05$). When the joint range of motion was compared between the two groups, a significant difference was found in the active/passive flexion of the elbow and the movements of the wrist in all directions ($p<0.05$). A significant difference was found between DASH, LYMQOL, and LYMQOL-21.question scores when the EBBS-total value was compared with other parameters in the group with lymphedema ($p<0.05$). When EBBS-Total values and upper extremity ROMs were compared in the lymphedema group, a significant correlation was found between shoulder active/passive flexion and wrist passive extension and radial deviation movements ($p<0.05$). When EBBS-Total values of the group without lymphedema were compared with other parameters, a significant relationship was found between EBBS-Total score and SPADI-Disability score ($p<0.05$). Again, when the EBBS-Total values of the group without lymphedema were compared with the upper extremity ROMs, no significant difference was found ($p>0.05$).

Breast cancer is the most common malignant tumor in the world among women. It constitutes 30% of all cancers seen in women (64). Since the 1950s, the incidence of breast cancer has continued to increase. The incidence of breast cancer and mortality increase with age. Considering the cancer-related mortality rate between the ages of 40-44, women with breast cancer are in the first place. The risk of developing the disease is directly related to age. The incidence of the disease increases with increasing age. Yoshimoto et al. When he evaluated the patients treated with the diagnosis of breast cancer according to age groups, he stated that the highest incidence of breast cancer was between the ages of 40-49 (65). The incidence of breast cancer in women increases especially after the age of 40, until the postmenopausal period (66). In our study, when we divided the women diagnosed with breast cancer into two groups as those with and without lymphedema, the median age of the group without lymphedema was 57 (66) years, and the median age of the group with lymphedema was 58 (67). No significant

difference was found between the two groups. These values were found to be compatible with the literature.

When we compared the BMI results of the groups, no significant difference was found between the two groups. The median BMI value of the group without lymphedema was 27.31 (24.34-35.99), and the median BMI value of the group with lymphedema was 26.99 (22.77-36.89). High BMI in the literature suggests that lymphedema may develop in women with breast cancer. The increase in fat mass due to obesity will increase the stress in the circulatory system and will increase the load of the lymphatic system and circulatory system as a result of the growth of fat cells and increased functions such as endocrine. In addition to damage from breast cancer surgery, the increase in lymphatic fluid volume may exceed the carrying capacity, increasing the risk of developing lymphedema in patients. Ridner et al. reported that the risk of developing lymphedema in obese patients increased 3.6 times compared to normal weight patients (68). Studies have shown that the quality of life decreases as a result of the decrease in the physical activity levels of the patients with the increase in BMI (67).

In our study, a significant difference was found between the DASH score of the group that developed lymphedema and the group that did not ($p<0.05$). When the scores were examined, the DASH median value of the group with lymphedema was 29.15 (11.6-55) and the median DASH value of the group without lymphedema was 13.30 (4.10-37.5). We found the median DASH value of the group with lymphedema to be higher than the group without lymphedema. Because the DASH score of the lymphedema group was higher, the disability rate of this group was higher than the group without lymphedema. Smoot et al. evaluated 144 patients, 73 of whom had lymphedema after breast cancer. When DASH score was compared, DASH score of lymphedema group was calculated higher. There is a similarity between the DASH score found in our study and this study. According to Pinto et al. In a study conducted on 100 breast cancer patients, 50 of whom had lymphedema, a significant difference was found between the DASH scores of the two groups ($p<0.05$). According to Pinto et al. stated that the lymphedema group had higher DASH scores (69). Dawes et al. In another study conducted by the lymphedema group, the results of upper extremity functions were found to be lower, similar to our study (70). Park et al. evaluated the upper extremity functions of patients who developed lymphedema after breast cancer using DASH scoring. They found that patients with lymphedema had worse upper

extremity functions, and patients exposed to lymphedema for a longer period of time had worse function levels (71). As a result, it can be said that the functions of the patients decrease after breast cancer, but the upper extremity functions worsen after the development of lymphedema. Our study was also found to be compatible with the literature.

When we evaluated the upper extremity range of motion of the groups, we did not find a significant difference between shoulder joint movements (active/passive flexion, abduction, external and internal rotation) in the two groups ($p>0.05$). We evaluated the elbow joint range of motion (active/passive flexion, active/passive supination and pronation), a significant difference was found between the two groups in terms of active and passive elbow flexions and passive supinations ($p<0.05$). We found a significant relationship between all movements of the wrist joint (active/passive flexion, extension, ulnar and radial deviation) ($p<0.05$). In the literature, aspects of the limitations differ in women who have undergone breast cancer surgery. Studies have shown only abduction limitation, as well as abduction-flexion or only internal-external rotation or flexion-abduction-external rotation limitation (21). In the study of Smoot et al. in breast cancer patients with and without lymphedema, shoulder ROM (especially shoulder abduction) and elbow flexion values were found to be lower in the lymphedema group. Elbow flexion values were similar when compared with our study in terms of ROM values. They reported that there was a significant difference between the groups with and without lymphedema in wrist flexion. Active wrist flexion range of motion was decreased in the lymphedema group (72). In terms of wrist and elbow flexion, this result is similar to our study. When Levangie et al. investigated the long-term effects of breast cancer treatment after treatment, they found that there was a 10-20 degree difference in shoulder flexion and abduction movements when compared to the contralateral side (73). We think that the reason for the decrease in elbow flexion in the lymphedema group is the presence of lymphedema and the related decrease in function. We think that the difference in wrist joint range of motion is due to the fact that the daily activity levels of the patients in the lymphedema group may be low and they do not use their arms for fear of increased edema.

Problems related to upper extremity functions occur frequently after breast cancer treatment and greatly affect daily life (74). After surgery, 10-60% of patients have at least one upper extremity problem (tingling, stiffness, edema, pain, weakness) (75). In our study, when the total SPADI scores between the two groups were examined,

no significant difference was found between the groups ($p>0.05$). However, when the sub-headings of the scale were examined, a significant difference was found between the SPADI-Disability scores between the two groups ($p<0.05$). In our study, when the total SPADI scores between the two groups were examined, no significant difference was found between the groups ($p>0.05$). However, when the sub-headings of the scale were examined, a significant difference was found between the SPADI-Disability scores between the two groups ($p<0.05$). We think that the difference in the postoperative time did not create a significant difference between the SPADI-Pain scores of the two groups. Shoulder pain is one of the most common problems after breast cancer surgery. Lee et al. reported the incidence of shoulder pain between 9% and 68% in patients diagnosed with breast cancer, Ewertz et al. Between 30% and 50% (between 3 and 5 years after surgery) (76,77). Devoogdt et al. and Lauridsen et al. In their study, it was revealed that patients with shoulder joint range of motion were more likely to complain of pain than those who did not (78). On the other hand, Özçınar et al. reported that patients had pain, limitation in shoulder movements and decreased functional capacity in the early postoperative period (79). According to Yilmaz et al. In one of his studies, the lymphedema group had a higher SPADI scale score. Higher scores from the scale indicate worse shoulder functions (80). According to these results, our results were compatible with the literature.

In our study, when we measured the quality of life of the patients, no significant difference was found between the group that developed lymphedema and the group that did not ($p>0.05$). Question 21 of the LYMQOL-Arm directly asks patients to rate their quality of life out of 10. The median value of the answers to this question in the lymphedema group was 7.5, and the median value was 9 in the non-lymphedema group. Although a good level of functional improvement is observed in the majority of patients after breast cancer treatment, it is stated that these treatments may have significant and long-lasting effects on the functional status of the upper extremities and activities of daily living (81). In addition, breast cancer-related lymphedema and breast cancer treatments have been found to have a negative effect on the upper extremity functional status and quality of life of patients (82). Orhan et al. In their study on 83 breast cancer patients, it was found that quality of life and upper extremity functional status were affected more in severe lymphedema than in mild lymphedema. However, a weak correlation was found between the severity of lymphedema and quality of life in the entire population (83). Beulac et al. When they searched for the most important factor

for quality of life, they found that lymphedema was. On the contrary, Kaya et al. found that lymphedema had no adverse effect on the subgroups of the quality of life scale. Atalay et al. also showed that lymphedema had no effect on quality of life subgroups (84). When our study was compared with the literature, it was similar to the literature.

Body awareness; It is the subjective and phenomenological aspect of proprioception and interception, which can be modified by mental processes such as attention, interpretation, evaluation, beliefs, memories, conditioning, attitude, and affect, and enters conscious awareness. Body awareness physiotherapy texts of the body; It is defined as a type of treatment for awareness of how it is used in terms of function, behavior and interaction with the self-other (85). There are not many resources in the literature on body awareness of patients with breast cancer. In our study, when we compared the body awareness scores of the two groups with and without lymphedema, no significant difference was found between the two groups ($p>0.05$). The median body awareness value of the lymphedema group was 105, and the median body awareness value was 107 in the non-lymphedema group. A high score from the body awareness scale indicates high awareness (63). As a result, the body awareness level of the group with lymphedema and the level of body awareness of the group without lymphedema were close to each other.

In our study, we determined that the group with lymphedema who underwent breast cancer treatment believed more in the benefits of exercise compared to the group without lymphedema.

Lovell et al. observed that a person might find a particular activity helpful, view it as a benefit and use it as a motivator to commit to the same behavior. At the same time, if a certain factor is thought to be a problem, the individual may see it as an obstacle and avoid this behavior. Therefore, individuals should perceive more motivating factors and benefits (63). According to Pender's 'Health Promotion Model,' "How one perceives and feels about illness and health matters." It is determined how adaptive the individual is toward the practice of health behavior. If the perception of benefit is reinforced by expanding the person's consciousness, health-related attitudes and behaviors are positively affected (86). Barriers to physical activity differ in various areas (e.g. exercise, leisure, health). According to Bandura's conceptualization theory of barriers, barriers to participation should be distinguished as real or perceived barriers. Real barriers may include lack of facilities, cost of services, or disease-related contraindications. Perceived barriers aim to slow or stop health behavior. Perceptions of

barriers are conceptualized as personal (e.g. fear, fatigue, embarrassment) and situational (e.g. lack of time, inclement weather) (56). Mathews et al. reported that motivators and barriers could vary according to education level, population, geography, personal preferences, and availability of resources (87). In case of high physical activity levels of cancer patients, benefits such as symptom relief, improvement of physical function and quality of life have been demonstrated. However, Blair and Connelly noted that patients' low physical activity levels were among the main risk factors for the prevalence of chronic diseases, including cancer. Marret et al. found the evidence of a possible relationship between physical activity and breast cancer (56). In a study examining participation in exercise in adults with cancer, participants perceived the benefits of exercise more. In this study, patients stated that exercise was a necessity for them, and they believed that exercise would prolong their lifespan Again, the highest scored questions were taken from the statements that would increase physical fitness, endurance, and flexibility. The same study found that regardless of cancer diagnosis, participants perceived the benefits of exercise and made efforts to improve their health (88). This study supports our study findings.

In their study with the participation of 93 patients with multiple sclerosis (MS), Stroud et al. evaluated the patients' EBBS scores. When the sub-scores of the scale were examined, they found that the mean EBBS Benefits score and the mean EBBS-Barriers score were 87+-13 and 39+-6, respectively, in MS patients. When we compared these scores with our study, it was observed that MS patients perceived the benefits of exercise more than breast cancer patients. Upon evaluating the exercise barrier scores of the patients alone, we also observed that MS patients perceived the barriers of exercise more than breast cancer patients (89). In the study conducted with MS patients, the highest perceived barrier in the questions about exercise barriers was the items related to physical effort (e.g., 'exercise is hard work for me', 'exercise makes me tired'). In the present study, when we examined the items that breast cancer patients scored the highest in the barrier scale in both groups, a similarity was found between MS patients and breast cancer patients. 'Fatigue' was among the most scored items in both disease groups.

Malone et al. evaluated the exercise perceptions of 152 people with orthopedic (scoliosis, arthritis, low back pain, amputation) diseases, cardiovascular, pulmonary (chronic obstructive pulmonary disease, hypertension, heart disease, dyslipidemia) diseases, neuromuscular (cerebral palsy, stroke, Parkinson's, spinal cord injury,

traumatic brain injury) diseases, and multiple (combination of two or more disabilities or chronic conditions) diseases. When the EBBS scores between the disease types were examined, no significant difference was found (90). The most frequent answers given for barriers were the answers 'Exercise is hard work for me', 'Exercise makes me tired', as in our study. The EBBS-Benefits scores of the evaluated exercise groups (cardio-pulmonary, orthopedic, neuromuscular and multiple conditions) were found to be higher compared to breast cancer patients in our study.

Winningham et al. stated that fatigue was the most common and most devastating symptom during cancer treatment (57). Another study examined the effect of exercise on perceived barriers and benefits after treatment in cancer survivors with 24 participants over the age of 18 who had completed treatment for different types of cancer (colon, testis, pancreas, breast). Exercise sessions were held in the form of 60-minute resistance exercises. As a result of this study, the participation of cancer survivors in exercise strengthened the perception that exercise reduced rather than caused fatigue (91). In our study, upon examining the items that breast cancer patients scored the highest in both groups, a similarity was found with other studies in the literature. Compared to other disease groups, we observed that the perception of the benefits of exercise of the group with breast cancer was lower. We think that we can change patients' perceptions of exercise in the direction of benefits by raising their awareness of this issue along with the training indicating that regular exercise will reduce fatigue levels. We also think that the higher perception of the benefits of exercise in the lymphedema group compared to the group without lymphedema was due to the fact that patients consulted a physiotherapist specialized in lymphedema only when swelling began in their arms during the cancer treatment process. No publication evaluating the exercise perceptions of breast cancer patients by grouping them according to their lymphedema was found in the literature. Therefore, more publications on this issue are needed to understand the exercise perception levels in patients with breast cancer in the presence of lymphedema.

We compared the EBBS-Total values of our study with other parameters in both groups. In the current study, we found that the perception of exercise in the lymphedema group was high in the direction of benefit. However, the upper extremity function levels were low. When the EBBS-total score of the non-lymphedema group was examined, the SPADI-disability scores increased as positive perception of exercise increased. When the effect of the EBBS-Total score on upper extremity ROMs in the

non-lymphedema group was examined, patients' high positive perceptions of exercise did not affect upper extremity ROMs.

Since the last 20 years, the importance of exercise in cancer patients has begun to be investigated. In the previous historical period, exercise was not recommended for patients with breast cancer after ALND and/or RT treatment. This recommendation originated from the belief that it could increase upper extremity lymphedema. In recent studies, no relationship indicating that exercise increases upper extremity lymphedema has been found (92). It is not yet known whether exercise alone prevents edema in patients at risk of developing lymphedema. However, all exercises apply external compression to the veins. Thus, they stimulate venolymphatic return (51). Accordingly, a patient with Stage 1 lymphedema can reduce lymphedema with elevation and exercise. Therefore, the lymphedema group may have a higher perception of the benefits of exercise.

When we evaluated patients' exercise perceptions and upper extremity functions, we thought that breast cancer patients were more limited in terms of participation in physical activity, even if they perceived exercise as a benefit in the lymphedema group. Irwin et al. reported that patients' level of participation in exercise decreased by approximately 2 hours per week after the diagnosis of breast carcinoma. This decrease reached up to 50% in patients who received both RT and chemotherapy treatment (93). In their study with 975 cancer patients, Blaney et al. indicated that 54.8% of the patients rarely or never did the physical activity (94). As a result of a 12-month study, Pinto et al. followed up the natural progression of the participation in exercise of 69 patients who had completed treatment for stage 0-2 breast cancer. They observed that patients' participation in exercise did not increase over time (82). In this case, we think that it is necessary to evaluate why patients do not do exercise together with their psychological state. Since breast cancer treatment involves a long and challenging process, we think that patients can avoid health attitudes and behaviors even if they are aware of the benefits of exercise. We consider that women with breast cancer may avoid exercise because they fear that lymphedema will develop in their arms or that lymphedema will increase in patients with lymphedema. Breast cancer patients who have undergone ALND frequently tell their clinicians that they are afraid of exercising due to the risk of developing lymphedema (92). Patients who develop lymphedema after breast cancer may believe that their lymphedema will increase as a result of moving their arms. Sunar et al. reported that kinesiophobia was quite common in patients undergoing breast

cancer treatment (95). Gencay et al. evaluated 81 breast cancer patients and reported that the rate of lymphedema was higher in patients with kinesiophobia (96).

In this study, we think that positive perceptions of exercise of patients with lymphedema were not sufficient for their functions and quality of life and that the exercise habits of patients should be gained while increasing their exercise perception levels. According to Bandura's Social Cognitive Theory, human behavior is affected by the social environment and is the result of the mutual influence of personal determinants. Bandura also mentioned Social Cognitive theory as learning by observation. Herken et al. observed that health behaviors were acquired from the immediate social environment. A patient in the recovery period after breast cancer surgery may acquire positive health behaviors (e.g., mastectomy-specific exercises) by observing a patient who has previously undergone the same surgery and recovered (97). From this point of view, we think that patients should participate in group exercises for a while after breast cancer treatment and should receive training on lymphedema and exercise, that their perceptions of exercise should be increased positively by increasing the possibilities of consulting a physiotherapist is specialized in oncological rehabilitation, and that their participation in exercise should also be supported. For future studies, we recommend that the effect of patients' exercise perceptions on functions and quality of life should be evaluated with more subjective results by recording the number of repetitions, intensity, frequency, and duration of exercise, such as an exercise diary.

Our study revealed a negative relationship between patients' higher perceptions of the benefits of exercise in the lymphedema group and the quality of life. However, we observed that the exercise perception levels of the group without lymphedema did not affect the quality of life of the patients.

It was determined that the incidence of arm and shoulder problems in patients decreased after breast-conserving surgery, which has become widespread in the surgical method. However, it was also observed that adjuvant radiotherapy administered in patients also increased arm and shoulder problems in patients with breast cancer. As a result of an examination on breast cancer patients, Montazeri reported that arm morbidity had adverse effects on the quality of life. In a study conducted by Nesvold et al. with 256 breast cancer patients, they compared the quality of life of the group with shoulder problems and lymphedema together and the group with only lymphedema, and the quality of life level of the group with shoulder problems and lymphedema was

found to be lower. Kwan et al. indicated that even low-level arm and shoulder problems might reduce the quality of life. Engel et al. stated that arm and shoulder problems affected the quality of life a few years after treatment (98). In their study conducted with 78 patients who developed lymphedema after breast cancer and 50 healthy individuals, Köylü et al. observed that the presence of lymphedema reduced physical functions. However, the same study reported that the presence of lymphedema affected the quality of life more than the severity of lymphedema (99). No study examining the relationship between the perception of exercise and the quality of life was found in the literature. We think that the quality of life of patients who develop lymphedema after breast cancer can be increased by increasing their exercise perceptions and participation in exercise.

As a result;

- We found that patients with breast cancer who developed lymphedema had higher exercise perceptions. We think that we have contributed to the literature in this regard, since we have not found any other publication in the literature that measures the exercise perceptions of patients with breast cancer by classifying them according to lymphedema.
- Even though the perception of exercise was high in the lymphedema group, we found that the rates of upper extremity disability were high.
- We found a difference in the range of motion of the groups between elbow flexion and all motions of the wrist joint. Our shoulder and wrist results were not compatible with the literature.
- We found that the body awareness levels of both groups were close to each other. We could not find similar studies in the literature examining body awareness according to lymphedema levels in patients with breast cancer.

Limitations of the study;

- Since the grouping of individuals with lymphedema according to the severity of lymphedema could not be done homogeneously in our study, exercise perceptions, quality of life and upper extremity functions could not be calculated according to the severity of lymphedema.

- We included breast cancer patients over the age of 18 in our study. We could not examine the exercise perceptions of breast cancer patients by age groups.
- Exercise perception, upper extremity functions, quality of life and body awareness could not be evaluated according to the development time of lymphedema, as the patients participating in the study did not know the exact development time of lymphedema.
- We think that the evaluation of exercise perceptions of patients after breast cancer together with their participation in exercise can be a guide for future studies.

REFERENCES

1. Donepudi MS, Kondapalli K, Amos SJ, Venkanteshan P. Breast Cancer Statistics and Markers. *Journal of Cancer Research and Therapeutics*, (2014); *10*(3): 506.
2. Özmen V. Dünya'da ve Türkiye'de Meme Kanseri. *Meme Sağlığı Dergisi*, (2008): *4*(2), 7-9.
3. Ferlay J, Soerjomataram I, Dikshit R, et al. Cancer Incidence and Mortality Worldwide: Sources, Methods and Major Patterns in GLOBOCAN 2012. *Int J Cancer*. 2015;136(5):E359-E386.
4. Maughan KL, Lutterbie MA, Ham P. Treatment of Breast Cancer. *American Family Physician*, 2010:*81*(11), 1339-1346.
5. Sledge GW, Mamounas EP, Hortobagyi GN, Burstein HJ, Goodwin PJ, Wolff AC. Past, Present, and Future Challenges in Breast Cancer Treatment. *J Clinical Oncology*. 2014;32(19):1979-1986.
6. Soyder A, Taştaban E, Özbaş S, Boylu Ş, Özgün H. Frequency of Early-Stage Lymphedema and Risk Factors in Postoperative Patients with Breast Cancer. *J Breast Health*. 2014;10(2):92-97.
7. Küçükaltun IG. Meme Kanseri Tedavisi Sonrasında Lenfödem Gelişen Kadın Hastalarda Komplet Dekonjestif Terapiye Pnömatik Kompresyon Tedavisinin Eklenmesinin Etkileri. *Diss*. Dokuz Eylül Üniversitesi Tıp Fakültesi, 2010.
8. Ostby PL, Armer JM. Complexities of Adherence and Post-Cancer Lymphedema Management. *Journal of Personalized Medicine*. 2015; 5(4):370-388.
9. Yılmaz E, Coşkun T. Meme Kanserli Hastalarda Üst Ekstremite Sorunları ve Yaşam Kalitesi. *Medical Journal of Bakirkoy*, (2019); *15*(1).
10. Orhan C, et al. "Meme Kanseri Tedavisiyle İlişkili Lenfödemi Olan Hastalarda Lenfödem Şiddetinin Yaşam Kalitesi, Üst Ekstremite Fonksiyonu ve Fiziksel Aktivite Düzeyi Üzerindeki Etkileri." *Anadolu Kliniği Tıp Bilimleri Dergisi*, 2019: 24(3);189-198.
11. Temur K, Kapucu S. Meme Kanseri İlişkili Lenfödem Gelişimini Önlemede Ve Yaşam Kalitesini Yükseltmede Etkin Yöntem: Kendi Kendine Lenfödem Yönetimi. *Osmangazi Tıp Dergisi*. 2018; 40(1): 121-129.
12. Chang CJ and Cormier JN. Lymphedema Interventions: Exercise, Surgery, and Compression Devices. In *Seminars in Oncology Nursing.* 2013:29(1),28-40.
13. Karadibak D, Yavuzsen T, Saydam S. Prospective Trial of Intensive Decongestive Physiotherapy for Upper Extremity Lymphedema. *Journal of Surgical Oncology*, 2008: *97*(7), 572-577.
14. Ingram C, Wessel J, Courneya KS. Women's Perceptions of Home-Based Exercise Performed During Adjuvant Chemotherapy for Breast Cancer. *European Journal of Oncology Nursing*, 2010:*14*(3), 238-243.

15. Kopuz C. Thorax (Göğüs) Ön ve Yan Duvarlarının Anatomisi. *Journal of Clinical and Analytical Medicine,* 2011:*2*(10), 43-51.

16. Cabioğlu N. Memenin Anatomisi ve Fizyolojisi. Özmen V, Çelik V, Güler N, Kapkaç M, Koyuncu A, Utkan Z, Müslümanoğlu M. ed. *Meme Hastalıkları Kitabı.* Ankara: Güneş Kitap Evi. 2012.

17. Rehfeld A, Nylander M, Karnov K. The Female Reproductive System. In *Compendium of Histology,* Springer, Cham. 2017.

18. Kocaay AFY, ALIÇ BTD. Palpabl Meme Lezyonlarının Histopatolojik Tanısında Ince Iğne Aspirasyonu ile Kesici Iğne Biyopsisinin Karşılaştırmalı Çalışması. *Doctoral Dissertation, Ankara* Üniversitesi Tıp Fakültesi Genel Cerrahi Anabilim Dalı.

19. Jesinger RA. Breast Anatomy for the Interventionalis*t*. Techniques in Vascular and Interventional Radiology, 2014, *17*(1), 3-9.

20. Çakır Peköz B. Memenin Benign ve Malign Lezyonlarının Ayrımında Kantitatif Elastografi. Ankara, Başkent Üniversitesi, 2016.

21. Korucu TŞ. Meme Kanseri Cerrahisi Sonrası Lenfödemi Olan ve Olmayan Kadınlarda Skapula ve Üst Ekstremite Fonksiyonları ve Yaşam Kalitesinin Karşılaştırılması. Izmir Katip Çelebi Üniversitesi, 2020.

22. Wamalwa AO, Stasch T, Nangole FW, Khainga SO. Surgical Anatomy Of Reduction Mammaplasty: A Historical Perspective And Current Concepts. *South African Journal Of Surgery*, 2017:*55*(1), 22-28.

23. Pandya S, Moore RG. Breast Development and Anatomy. *Clinical Obstetrics and Gynecology*, 2011: *54*(1), 91-95.

24. Prendergast PM. Fascia, Nerve Supply, and Lymphatics of the Breast. In *Aesthetic Surgery of the Breast.* Springer, Berlin, Heidelberg, 2015.

25. Güven G, Özden H. Meme Lenfatiklerinin Anatomik Yapısı ve Klinik Önemi. *Dirim Tıp Dergisi*, 2008:*82,* 7-12.

26. Bland KI. Topographic Anatomical Relationships of the Breast, Chest Wall, Axilla, and Related Sites of Metastases. In *Oncoplastic Breast Surgery Techniques for the General Surgeon*. Springer, Cham, 2020.

27. Kanser Nedir? T.C. Sağlık Bakanlığı Halk Sağlığı Kurumu, 2016. http://kanser.gov.tr/ kanser/kanser-nedir/4-kanser-nedir.html. (10.12.2017)

28. Yeşil S. Bilateral Meme Kanseri Radyoterapisinde Tomoterapi Helikal Ve Tomoterapi Direkt Tedavi Tekniklerinin Dozimetrik Olarak Karşılaştırılması. *Doctoral dissertation*, İstanbul Aydın Üniversitesi Sağlık Bilimleri Enstitüsü, 2019.

29. Board PDQ Adult Treatment Editorial. Breast Cancer Treatment (Adult) PDQ®. In: *PDQ Cancer Information Summaries [Internet]*. National Cancer Institute (US), 2020.

30. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global Cancer Statistics, 2012. CA: *A Cancer Journal For Clinicians*, 2015, *65*(2), 87-108.

31. Stuckey A. Breast Cancer: Epidemiology and Risk Factors. *Clinical Obstetrics and Gynecology*, 2011: *54*(1), 96-102.

32. Wei EK, Wolin KY, Colditz GA. Time Course Of Risk Factors İn Cancer Etiology and Progression. *Journal of Clinical Oncology*, 2010: *28*(26), 4052.

33. Aydıntuğ S. *Meme kanserinde erken tanı*. Sted, 2004, 13(6), 226-8.

34. Akyolcu N, Uğraş GA. Kendi Kendine Meme Muayenesi: Erken Tanıda Ne Kadar Önemli?. *Meme Sağlığı Dergisi/Journal of Breast Health*, 2011, 7(1).

35. Radice D, Redaelli A. Breast cancer management. *Pharmacoeconomics*, 2003, 21(6), 383-396.

36. Büyükakıncak Ö, Akyol Y, Özen N, et al. Meme Kanseri Cerrahisi: Üst Ekstremite İçin Bir Problem Midir?. *Turkish Journal Of Physical Medicine & Rehabilitation/Turkiye Fiziksel Tip Ve Rehabilitasyon Dergisi*, 2013, 59(4).***

37. Bland KI, Chang HR, Copeland III EM. Modified radical mastectomy and simple mastectomy. *In The Breast* 2018, 443-461.

38. Jones C, Lancaster R. Evolution Of Operative Technique For Mastectomy. *Surgical Clinics*, 2018;98(4):835-844.

39. Meme Kanserinde Cerrahi Yöntemler. (2017) Meme Kanserinde Yenilikler. https://www.memekanserindeyenilikler.com/meme-kanseri-tedavi-yontemleri/meme-kanserinde-cerrahiyontemler/. (10.12.2017)

40. Lazow SP, Riba L, Alapati A, James TA. Comparison of breast-conserving therapy vs mastectomy in women under age 40: National trends and potential survival implications. *The breast journal*; 2019:*25*(4),578-584.

41. Sürmeli M. Meme Kanseri Cerrahisi Sonrası Lenfödem Gelişen Ve Gelişmeyen Kadınların Üst Ekstremite Fonksiyonu, Spinal Stabilite Ve Solunum Fonksiyonlarının İncelenmesi. Abant Izzet Baysal Üniversitesi, 2018.

42. Balducci L, Hoover S, Greenberg H. Cancer: Breast, Birren, E.J., *Encyclopedia of Gerontology (Second Edition), Elsevier*, 2007;213-224.

43. Dubsky P, Pinker K, Cardoso F, et al. Breast conservation and axillary management after primary systemic therapy in patients with early-stage breast cancer: the Lucerne toolbox. *The Lancet Oncology*, 2021:*22*(1),18-28.

44. Bernard-Marty C, Cardoso F, Piccart MJ. Facts and controversies in systemic treatment of metastatic breast cancer. *The oncologist*, 2004:*9*(6),617-632.

45. Mayer EL, Burstein HJ. Chemotherapy for Metastatic Breast Cancer. *Hematology/Oncology Clinics Of North America*, 2007:*21*(2),257-272.

46. Locker GY. Hormonal Therapy of Breast Cancer. *Cancer Treatment Reviews*, 1998:*24*(3),221-240.

47. Carlson RW, Henderson IC. Sequential Hormonal Therapy For Metastatic Breast Cancer After Adjuvant Tamoxifen Or Anastrozole. *Breast Cancer Research And Treatment*, 2003;*80*(1):19-26.

48. Toktaş H, Çevik H, Dündar Ü, Güleç Ö. Lenfödem Tedavisi. *Kocatepe Tıp Dergisi*, 2015; *16*(4):269-272.

49. Greene AK, Slavin SA, Brorson H. (Eds.). Lymphedema: Presentation, Diagnosis, And Treatment. *Springer*. 2015.

50. Lee BB, Rockson SG, Bergan J. (Eds.). Lymphedema: A Concise Compendium Of Theory And Practice. *Springer*. 2018:69(1),879-880.

51. Bakar Y, Berdici B, Şahin N, Pala ÖO. Lymphedema After Breast Cancer And İts Treatment. *J Breast Health*, 2014:*10*,6-14.

52. Zuther JE, Norton S, Armer JM. Lymphedema Management: The Comprehensive Guide For Practitioners. *New York: Thieme*, 2009.

53. Borman P. Lymphedema Diagnosis, Treatment, And Follow-Up From The View Point Of Physical Medicine And Rehabilitation Specialists. *Turkish Journal Of Physical Medicine And Rehabilitation*, 2018:*64*(3),179.

54. Andrade M. Clinical Diagnosis: General Overview. *Lymphedema*, 2011:83-88.

55. Warren AG, Brorson H, Borud LJ, Slavin SA. Lymphedema: A Comprehensive Review. *Annals Of Plastic Surgery*, 2007:*59*(4), 464-472.

56. Sun F, Hall A, Tighe MP, Brunelle CL, Sayegh HE, Gillespie, TC, Taghian AG. Perometry Versus Simulated Circumferential Tape Measurement For The Detection Of Breast Cancer-Related Lymphedema. *Breast Cancer Research And Treatment*, 2018:*172*(1), 83-91.

57. Ainsworth MC. Examining The Role of Perceived Benefits and Barriers in Physical Activity Behavior for Cancer Prevention and Control. *Doctoral Dissertation*, The University of Alabama at Birmingham, 2019.

58. Brawley LR, Culos-Reed, SN, Angove J, Hoffman-Goetz L. Understanding The Barriers To Physical Activity For Cancer Patients: Review And Recommendations. *Journal Of Psychosocial Oncology*, 2003, *20*(4), 1-21.

59. Ayaz S, Doğan R. Hemşirelerin Egzersiz Davranişlari, Öz Yeterlilik Düzeyleri Ve İlişkili Faktörler. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi*, 2015. **18**(4), 287-295.

60. Saadet O, Demirel H, Sade, A. Tedavi Hareketlerinde Temel Değerlendirme Prensipleri. Üçüncü Baskı. *Ankara, Hacettepe Üniversitesi Fizik Tedavi Ve Rehabilitasyon Yüksekokulu Yayınları*, 2003:66-73.

61. Düger T, Yakut E, Öksüz Ç, Yörükan S, Bilgütay BS, Ayhan Ç et. all. Kol, Omuz Ve El Sorunları (Disabilities Of The Arm, Shoulder And Hand-DASH) Anketi

Türkçe Uyarlamasının Güvenirliği Ve Geçerliği. *Fizyoterapi Rehabilitasyon*, 2006:*17*(3), 99-107.

62. Bumin G, Tüzün EH, Tonga E. The Shoulder Pain And Disability Index (SPADI): Cross-Cultural Adaptation, Reliability and Validity of The Turkish Version. *Journal of Back And Musculoskeletal Rehabilitation*, 2008:*21*(1), 57-62.
63. Vatansever ÖM. Farklı Fiziksel Aktivite Düzeyindeki Sağlıklı Bireylerde Vücut Farkındalığı İle Denge Ve Postür Arasındaki İlişkinin İncelenmesi. Yüksek Lisans Tezi, HÜ Sağlık Bilimleri Enstitüsü, 2018.
64. Aslan FE and Gürkan A. Kadinlarda meme kanseri risk düzeyi. *Meme Sağliği Dergisi*, 2007:*3*, 63-68.
65. Haydaroğlu, A., et al. "Ege Üniversitesinde meme kanserleri: 3897 olgunun değerlendirilmesi." (2005).
66. Ma J, Jemal A. Breast Cancer Statistics. In: Ahmad A. Ed. Breast Cancer Metastasis and Drug Resistance. New York: Springer; 2013:4.
67. Helms RL, O'Hea EL, Corso M. Body image issues in women with breast cancer. *Psychol Health Med*. 2008;13(3):313-325
68. Ridner, Sheila H., et al. "Body mass index and breast cancer treatment-related lymphedema." *Supportive Care in Cancer* 19.6 (2011): 853-857.
69. Pinto M, et al. Upper Limb Function And Quality Of Life İn Breast Cancer Related Lymphedema: A Cross-Sectional Study. *Eur J Phys Rehabil Med* 2013:49(5): 665-73.
70. Dawes DJ, Meterissian S, Goldberg M, Mayo NE. Impact Of Lymphoedema On Arm Function And Health-Related Quality Of Life İn Women Following Breast Cancer Surgery. J Rehabil Med, 2008; 40(8): 651-8.
71. Park JE, Jang HJ, Seo KS. Quality of life, Upper Extremity Function And The Effect Of Lymphedema Treatment İn Breast Cancer Related Lymphedema Patients. Ann Rehabil Med, 2012; 36(2): 240-7
72. Smoot B, et al. Upper Extremity İmpairments İn Women With Or Without Lymphedema Following Breast Cancer Treatment. *Journal Of Cancer Survivorship*, 2010:4(2);167-178.
73. Levangie PK and Drouin J. Magnitude Of Late Effects Of Breast Cancer Treatments On Shoulder Function: A Systematic Review. Breast Cancer Research And Treatment, 2009:116(1), 1-15.
74. Hidding JT. Beurskens CH. van der Wees PJ. van Laarhoven HW. Nijhuis-van der Sanden MW. Treatment Related İmpairments İn Arm And Shoulder İn Patients With Breast Cancer: A Systematic Review. *PLoS One* 2014; 9;9(5):e96-748.
75. Hayes SC. Johansson K. Stout NL et al. Upper-Body Morbidity After Breast Cancer: Incidence And Evidence For Evaluation. Prevention. And Management

Within A Prospective Surveillance Model Of Care. *Cancer* 2012;118(8):2237-2249.

76. Togawa K, Ma H, Sullivan-Halley J, Neuhouser ML et al. Risk Factors For Self-Reported Arm Lymphedema Among Female Breast Cancer Survivors: A Prospective Cohort Study. *Breast Cancer Research*, 2014;16(4):414.
77. Lee TS, Kilbreath SL, Refshauge KM, Herbert R, and Beith JM. Prognosis Of The Upper Limb Following Surgery And Radiation For Breast Cancer. *Breast Cancer Research And Treatment*, 2008:110(1), 19-37.
78. Blaney JM, Lowe-Strong A, Rankin-Watt J, Campbell A, Gracey JH. Cancer survivors' exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: a questionnaire-survey. *Psychooncology*. 2013;22(1):186-194.
79. Özçınar B. Güler SA. Özmen V et al.. Meme Kanserinde Lokal/Bölgesel Tedavi Sonrası Görülen Komplikasyonlar ve Bunların Hasta Yaşam Kalitesi Üzerine Etkileri. *The Journal Of Breast Health* 2010; 6(1):9-16.
80. Yılmaz E, Coşkun T. Upper Extremity Problems and Quality of Life in Patients with Breast Cancer. *Bakirkoy Tip Dergisi.* 2019;15(1):29-37.
81. Khan F, Amatya B, Pallant JF, Rajapaksa I. Factors Asso- Ciated With Long-Term Functional Outcomes And Psychological Sequelae İn Women After Breast Cancer. *Breast.* 2012;21(3):314–20.
82. Park JE, Jang HJ, Seo KS. Quality Of Life, Upper Extremity Function And The Effect Of Lymphedema Treatment İn Breast Cancer Related Lymphedema Patients. *Ann Rehabil Med*. 2012;36(2):240–7.
83. Pinto BM, Trunzo JJ, Reiss P, Shiu SY. Exercise participation after diagnosis of breast cancer: trends and effects on mood and quality of life. *Psychooncology*. 2002;11(5):389-400.
84. Şimşir Atalay N, et al. Meme Cerrahisi ve Aksiller Diseksiyon Uygulanan Meme Kanserli Hastalarda Üst Ekstremite Problemlerinin Sıklığı ve Yaşam Kalitesine Etkisi. *Journal of Physical Medicine & Rehabilitation Sciences/Fiziksel Tup ve Rehabilitasyon Bilimleri Dergisi*, 2011, 14.
85. Vatansever, ÖM. Farklı Fiziksel Aktivite Düzeyindeki Sağlıklı Bireylerde Vücut Farkındalığı İle Denge Ve Postür Arasındaki İlişkinin İncelenmesi, 2018.
86. Aluş-Tokat M, Okumuş H. Başarılı Emzirme İçin Kuram ve Modele Dayalı Hemşirelik Uygulamaları Nasıl Geliştirilir. 2008; 8.
87. Shaikh AA, Dandekar SP. Perceived Benefits And Barriers To Exercise Among Physically Active And Non-Active Elderly People. *Disability, CBR & Inclusive Development*, 2019:*30*(2), 73-83.
88. Conklin BH. Factors İnfluencing Exercise Participation İn Adults With Cancer. University of Alaska Anchorage, 2000.

89. Stroud N, Minahan C, Sabapathy S. The Perceived Benefits And Barriers To Exercise Participation İn Persons With Multiple Sclerosis. *Disability and rehabilitation*, 2009, *31*(26), 2216-2222.

90. Malone LA, Barfield JP, Brasher JD. Perceived Benefits And Barriers To Exercise Among Persons With Physical Disabilities Or Chronic Health Conditions Within Action Or Maintenance Stages Of Exercise. *Disabil Health J*. 2012;5(4):254-260.

91. Marshall T, Andzel W, Spaccarotella K. Effects of Exercise on Perceived Barriers and Benefits of Exercise by Cancer Survivors Post Treatment, *Archives of Physical Medicine and Rehabilitation*, 2017:98(10),62.

92. Kwan, M. L., Cohn, J. C., Armer, J. M., Stewart, B. R., & Cormier, J. N. (2011). Exercise in patients with lymphedema: a systematic review of the contemporary literature. *Journal of Cancer Survivorship*, *5*(4), 320-336.

93. Irwin ML, Crumley D, McTiernan A, et al. Physical activity levels before and after a diagnosis of breast carcinoma: the Health, Eating, Activity, and Lifestyle (HEAL) study. *Cancer*. 2003;97(7):1746-1757.

94. Blaney JM, Lowe-Strong A, Rankin-Watt J, Campbell A, Gracey JH. Cancer survivors' exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: a questionnaire-survey. *Psychooncology*. 2013;22(1):186-194.

95. Dawes DJ, Meterissian S, Goldberg M, Mayo NE. Impact Of Lymphoedema On Arm Function And Health-Related Quality Of Life İn Women Following Breast Cancer Surgery. J Rehabil Med, 2008; 40(8): 651-8.

96. Gencay Can A, Can SS, Ekşioğlu E, Çakcı FA. Is kinesiophobia associated with lymphedema, upper extremity function, and psychological morbidity in breast cancer survivors?. *Turk J Phys Med Rehabil*. 2018;65(2):139-146.

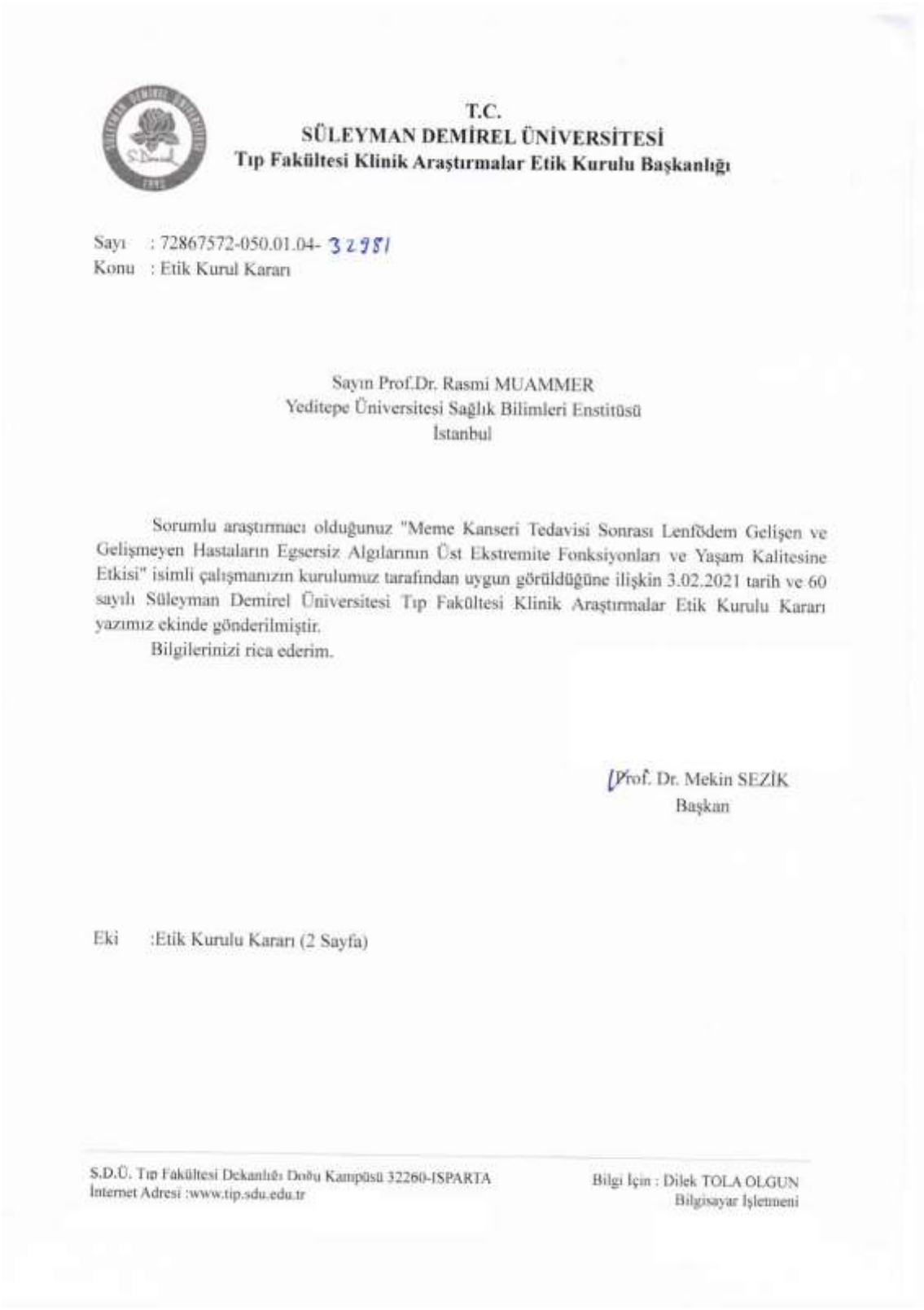
97. Gözüm S, Bağ B. Etkin Sağlık Eğitiminde Sosyal Bilişsel Öğrenme Kuramının Kullanımı. *Anadolu Hemşirelik Ve Sağlık Bilimleri Dergisi*, 1998;*1*(2).

98. Nesvold IL, Fosså SD, Holm I, Naume B, Dahl AA. Arm/shoulder problems in breast cancer survivors are associated with reduced health and poorer physical quality of life. *Acta Oncol*. 2010;49(3):347-353.

99. Uyar Köylü S, Dalyan M, Ünsal Delialioğlu S. The Effect Of Breast Cancer Related Lymphedema On Health Related Quality Of Life. *Journal Of Physical Medicine & Rehabilitation Sciences/Fiziksel Tıp Ve Rehabilitasyon Bilimleri Dergisi*, 2020;*23*(3).

APPENDİX

Appendix 1 Ethical Committee Approval



T.C.
SÜLEYMAN DEMİREL ÜNİVERSİTESİ
Tıp Fakültesi Klinik Araştırmalar Etik Kurulu Başkanlığı

Sayı : 72867572-050.01.04- 32981
Konu : Etik Kurul Kararı

Sayın Prof.Dr. Rasmi MUAMMER
Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü
İstanbul

Sorumlu araştırmacı olduğunuz "Meme Kanseri Tedavisi Sonrası Lenfödem Gelişen ve Gelişmeyen Hastaların Egsersiz Algılarının Üst Ekstremite Fonksiyonları ve Yaşam Kalitesine Etkisi" isimli çalışmanızın kurulumuz tarafından uygun görüldüğüne ilişkin 3.02.2021 tarih ve 60 sayılı Süleyman Demirel Üniversitesi Tıp Fakültesi Klinik Araştırmalar Etik Kurulu Kararı yazımız ekinde gönderilmiştir.

Bilgilerinizi rica ederim.

Prof. Dr. Mekin SEZİK
Başkan

Eki :Etik Kurulu Kararı (2 Sayfa)

S.D.Ü. Tıp Fakültesi Dekanlığı Doğu Kampüsü 32260-ISPARTA
İnternet Adresi :www.tip.sdu.edu.tr

Bilgi İçin : Dilek TOLA OLGUN
Bilgisayar İşletmeni

Appendix 2 Exercise Benefits/Barriers Scale

	Kesinlikle katılıyorum	Katılıyorum	Katılmıyorum	Kesinlikle katılmıyorum
1. Egzersizden hoşlanırım				
2. Egzersiz stres ve gerilim duygularımı azaltır.				
3. Egzersiz akıl sağlığımın gelişimini sağlıyor.				
4. Egzersiz çok fazla zamanımı alır.				
5. Egzersiz yaparak kalp krizlerini önleyebilirim.				
6. Egzersiz beni yoruyor.				
7. Egzersiz kas gücümü arttırır.				
8. Egzersiz bana kişisel başarı hissi verir.				
9. Egzersiz yerleri çok fazla uzak				
10. Egzersiz bana gevşediğimi hissettirir				
11.Egzersiz yaparken arkadaşlarım ve sevdiklerimle birlikte olabilirim.				
12. Egzersiz benim için çok sıkıcı				
13. Egzersiz yapma beni yüksek tansiyondan korur.				
14. Egzersiz çok fazla paraya mal olur.				
15. Egzersiz yapmak fiziki zindeliğimi arttırır.				
16. Egzersiz yapılan tesislerin programı bana uygun değil				
17. Egzersiz kas kitlemi arttırır.				
18. Egzersiz yapmak kalp-damar sistemimin işlerliğini arttırır				

Appendix 2 Exercise Benefits/Barriers Scale

	Kesinlikle katılıyorum	Katılıyorum	Katılmıyorum	Kesinlikle katılmıyorum
19. Egzersizden yorulurum.				
20. Egzersiz yapmak bana keyif verir.				
21. Eşim (ya da önemli başka biri) egzersiz yapmayı teşvik etmez				
22. Egzersiz dayanıklılığımı arttırır				
23. Egzersiz esnekliğimi arttırır				
24. Egzersize ailemden daha çok zaman ayırıyorum.				
25. Egzersiz mizacımı geliştirilir				
26. Egzersiz yapmam geceleri daha iyi uyumama yardımcı olur.				
27. Egzersiz yaparsam daha uzun yaşarım.				
28. Egzersiz kıyafetleri içindeki insanların komik göründüğünü düşünürüm				
29. Egzersiz yorgunluğumu alır				
30. Egzersiz yapma yeni insanlarla tanışmam için iyi bir yoldur				
31. Fiziksel dayanıklılığım egzersiz yapma ile arttı				
32. Egzersiz yapma benlik kavramımı geliştirir				
33. Aile üyelerim egzersiz yapmak için beni teşvik etmez				
34. Egzersiz yapma zihinsel uyanıklılığımı arttırır				
35. Egzersiz normal aktivitelerimi yorulmadan sürdürmemi sağlar				

Appendix 2 Exercise Benefits/Barriers Scale

	Kesinlikle katılıyorum	Katılıyorum	Katılmıyorum	Kesinlikle katılmıyorum
36. Egzersiz çalışmamın kalitesini arttırır				
37. Egzersiz aile sorumluluklarımdan daha fazla zaman alır				
38. Egzersiz benim için bir eğlencedir				
39. Egzersiz başkaları tarafından kabul edilmemi sağlar.				
41. Egzersiz tüm vücut fonksiyonlarımı düzeltir.				
42. Egzersiz yapabilmem için çok az yer var.				
43. Egzersiz vücut görünümümü geliştirme yoludur.				

APPENDIX 3 Disability of Arm, Shoulder and Hand Questionnaire

KOL, OMUZ VE EL SORUNLARI ANKETİ

DASH-T

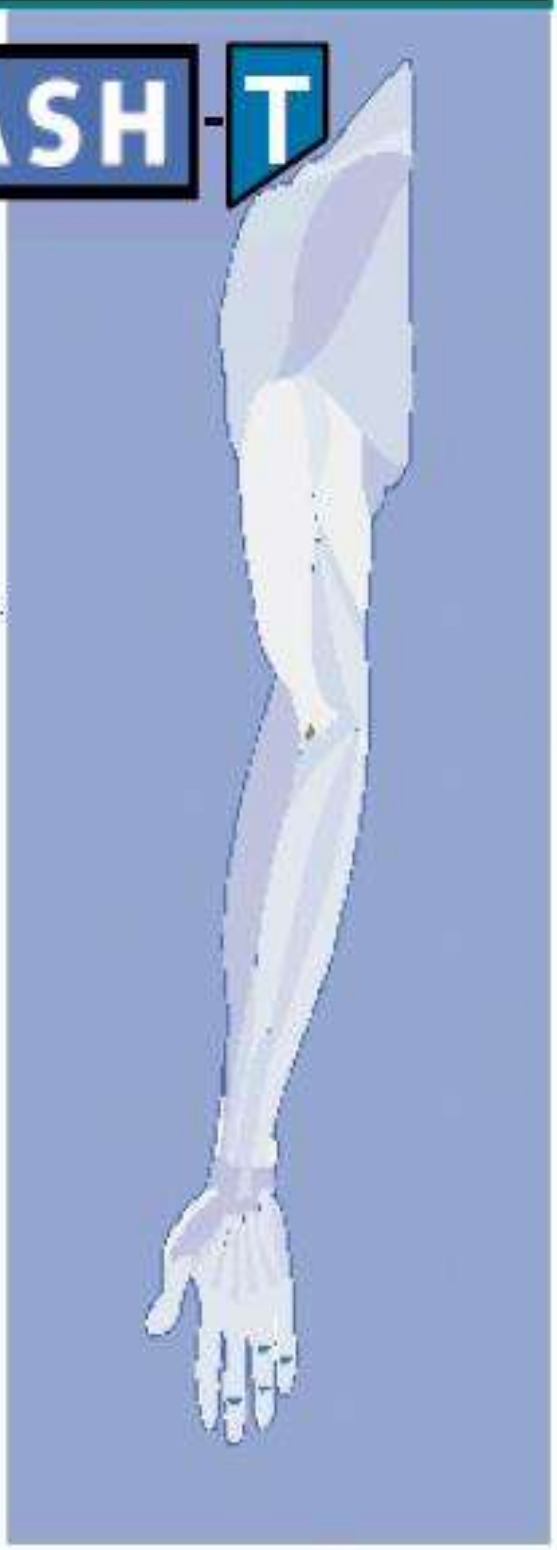
AÇIKLAMA

Bu anket bazı bedensel etkinlikleri yerine getirmenizin yanı sıra hastalık belirtilerinizi sormaktadır.

Her soruyu son haftadaki durumunuzu göz önüne alarak uygun numarayı yuvarlak içine almak suretiyle cevaplayınız.

Son hafta içinde bedensel etkinliği yapma fırsatınız olmadıysa,lütfen hangi cevabın en doğru olacağına göre en iyi tahmininizi yapınız.

Hangi el veya kolunuzu kullandığınızı dikkate almadan sadece bedensel etkinliği yapabilme becerinize göre uygun cevabı verin.



APPENDIX 3 Disability of Arm, Shoulder and Hand Questionnaire

KOL, OMUZ VE EL SORUNLARI ANKETİ

Lütfen son hafta içindeki aşağıdaki etkinlikleri yapma yeteneğinizi uygun cevabın altındaki numarayı daire içine alarak sıralayınız.

	Zorluk Yok	hafif derecede zorluk	orta derecede zorluk	aşırı zorluk	hiç yapamama
1-Sıkı kapatılmış yada yeni bir kavanozu açmak	1	2	3	4	5
2-Yazı yazmak	1	2	3	4	5
3-Anahtarı çevirmek	1	2	3	4	5
4-Yemek hazırlamak	1	2	3	4	5
5-Zor açılan bir kapıyı iterek açma	1	2	3	4	5
6-Yukarıdaki bir rafa bir şey yerleştirmek	1	2	3	4	5
7-Ağır ev işleri yapmak (duvar silmek, yer silmek,tamirat yapmak vs.)	1	2	3	4	5
8-Bağ bahçe işleri yapmak,odun kesmek	1	2	3	4	5
9-Yatak yapmak	1	2	3	4	5
10-Alışveriş çantası yada evrak çantası taşımak	1	2	3	4	5
11-Ağır bir cismi taşımak (4.5 kg'den fazla.)	1	2	3	4	5
12-Yukarıdaki bir ampulü değiştirmek.	1	2	3	4	5
13-Saçları yıkamak veya kurulamak.	1	2	3	4	5
14-Sırtını yıkamak.	1	2	3	4	5
15-Kazak giymek	1	2	3	4	5
16-Yiyecekleri kesmek için bıçak kullanmak	1	2	3	4	5
17-Az çaba gerektiren eğlendirici işler (iskambil oynamak, örgü örmek vs.)	1	2	3	4	5
18-Kolunuzdan, omuzunuzdan veya elinizden güç aldığınız veya darbe vurduğunuz eğlenceye yönelik etkinlikler (önünüzde yerde bulunan bir konserve kutusu veya küçük bir taşa iki elinizle kavradığınız bir sopayla yandan vurmak,tenis oynamak,masa tenisi oynamak)	1	2	3	4	5
19-Kolunuzu serbestçe hareket ettirdiğiniz eğlendirici işler (suda taş kaydırmak, meyve taşlama, çelik çomak oynama)	1	2	3	4	5
20-Ulaşım ihtiyaçlarını kendi başına giderebilmek (bir yerden başka bir yere gitmek)	1	2	3	4	5
21-Cinsel faaliyetler	1	2	3	4	5

APPENDIX 3 Disability of Arm, Shoulder and Hand Questionnaire

	Hiç engel yok	Az engel	Orta derecede	Bir hayli	Aşırı
22-Son hafta süresince kol omuz yada el sorununuz aile arkadaşlar, komşular veya gruplarla normal sosyal etkinliklerinize *ne ölçüde* engel oldu	1	2	3	4	5

	Hiç kısıtlanmış Hissetmiyorum	Hafif derecede kısıtlı	Orta derecede kısıtlı	Çok kısıtlı	Bedensel etkinlik yapamıyorum
23-Son hafta süresince kol omuz yada el sorununuz nedeniyle işinizde yada diğer günlük etkinliklerde kısıtlandınız mı?	1	2	3	4	5

	Yok	Hafif	Orta derecede	Bir hayli	Aşırı
24-El, omuz ya da kol ağrınız	1	2	3	4	5
25-Herhangi belirli bir işi yaptığınızda el,omuz ya da kol ağrınız	1	2	3	4	5
26-El,omuz yada kolunuzdaki karıncalanma(iğnelenme)	1	2	3	4	5
27-El,omuz yada kolunuzdaki güçsüzlük	1	2	3	4	5
28-El, omuz yada kolunuzdaki hareket zorluğu	1	2	3	4	5

	Zorluk Yok	hafif derecede zorluk	orta derecede zorluk	aşırı zorluk uyuyamıyorum	O kadar zorluk var ki
29-Geçen hafta içinde el, omuz yada kol ağrınız nedeniyle uyumada ne kadar zorlandınız	1	2	3	4	5

	Kesinlikle Katılmıyorum	Katılmıyorum	Ne katılıyorum ne katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
30-Kol, omuz veya el problemimden dolayı kendimi daha az yeterli, daha az yararlı hissediyor veya kendime daha az güveniyorum.	1	2	3	4	5

APPENDIX 4 Shoulder Pain and Disability Index

OMUZ AĞRI VE DİSABİLİTE İNDEKSİ

Lütfen geçen hafta omuz probleminizi en iyi belirten puanı işaretleyin.

AĞRI SKALASI

Ağrınız ne kadar şiddetlidir?

Ağrınızı en iyi tanımlayan rakamı daire içine alınız. 0=hiç ağrı yok 10= düşünülebilen en kötü ağrı.

Ağrınızın en kötü hali	0	1	2	3	4	5	6	7	8	9	10
Etkilenmiş taraf üzerine yatarken	0	1	2	3	4	5	6	7	8	9	10
Yüksek raftaki bir şeye uzanırken	0	1	2	3	4	5	6	7	8	9	10
Yüksek raftaki bir şeye uzanırken	0	1	2	3	4	5	6	7	8	9	10
Etkilenmiş kolla iterken	0	1	2	3	4	5	6	7	8	9	10

Toplam skor:_____/50×100=_____%

(Eğer hasta tüm sorulara cevap vermemişse mümkün olan skoru böl. Örneğin 1 soru eksikse 40 üzerinden böl.)

APPENDIX 4 Shoulder Pain and Disability Index

DİSABİLİTE SKALASI

Ne kadar zorluk çekiyorsunuz?

Durumunuzu en iyi tanımlayan rakamı daire içine alınız. 0=hiç zorluk yok 10= aşırı zor, yardıma ihtiyaç duyuyor.

Saçınızı yıkarken	0	1	2	3	4	5	6	7	8	9	10
Sırtınızı yıkarken	0	1	2	3	4	5	6	7	8	9	10
atlet yada kazak giyerken	0	1	2	3	4	5	6	7	8	9	10
Önden düğmeli gömlek giyerken	0	1	2	3	4	5	6	7	8	9	10
Pantolonunuzu giyerken	0	1	2	3	4	5	6	7	8	9	10
Yüksek bir rafa bir eşya koyarken	0	1	2	3	4	5	6	7	8	9	10
4.5 kg'lık ağır bir eşyayı taşırken	0	1	2	3	4	5	6	7	8	9	10
Arka cebinizden bir şey çıkarırken	0	1	2	3	4	5	6	7	8	9	10

Toplam disabilite puanı: :_____/ 80×100=_____%

(Eğer hasta tüm sorulara cevap vermemişse mümkün olan skoru böl. Örneğin 1 soru eksikse 70 üzerinden böl.)

Toplam OADİ skor: :_____/ 130×100=_____%

APPENDIX 5 Body Awareness Scale

VÜCUT FARKINDALIĞI ANKETİ

Aşağıdaki ifadelerde insanların kendileriyle ilgili hissettikleri bazı durumlar listelenmiştir. Her ifadeyi okuduktan sonra ifadenin solundaki boşluğa ifadenin sizin için hangi derecede doğru olduğunu 1'den 7'ye kadar değerlendirerek numarayı yazınız. Doğru veya yanlış cevaplar yoktur. En doğru cevap ifadenin sizin tecrübenize uygunluğunu dürüstçe yansıtandır.

Benim için hiç doğru değil Benim için tamamen doğru

1 2 3 4 5 6 7

1. Vücudumun çeşitli yiyeceklere verdiği tepkilerdeki farklılığı anlarım.
2. Bir yerimi çarptığımda berelenme olup olmayacağını her zaman söyleyebilirim.
3. Kendimi ertesi gün ızdırap duyacak kadar fiziksel olarak zorlayıp zorlamadığımı her zaman bilirim.
4. Bazı yiyecekleri yediğim zaman enerji düzeyimdeki değişimleri her zaman fark ederim.
5. Grip olacağımı önceden anlarım.
6. Dereceyle ölçmeden ateşimin olduğunu bilirim.
7. Açlıktan kaynaklanan yorgunluk ile uykusuzluktan kaynaklanan yorgunluk arasındaki farkı ayırt edebilirim.
8. Uykusuzluğun beni günün hangi saatinde etkileyeceğini doğru tahmin edebilirim.
9. Gün boyunca aktivite düzeyimdeki değişikliklerin farkındayım.
*10.Vücut fonksiyonlarımdaki mevsimsel ritim ve döngüleri fark etmiyorum.
11. Sabah uyanır uyanmaz gün boyunca ne kadar enerjim olacağını bilirim.
12. Yatağa gittiğimde o gece ne kadar iyi uyuyacağımı söyleyebilirim.
13. Yorgun olduğumda vücudumdaki belirgin tepkileri fark ederim.
14. Hava değişikliklerine karşı vücudumun verdiği tepkileri fark ederim.
15. Dinlenmiş bir şekilde uyanmak için gece ne kadar uyumam gerektiğini tahmin edebilirim.

16. Egzersiz alışkanlıklarım değiştiğinde enerji düzeyimin nasıl etkileneceğini tahmin edebilirim.

APPENDIX 5 Body Awareness Scale

17. Benim için gece uyumaya gitmenin belli bir uygun zamanı vardır.
18. Aşırı açlık durumundaki özel vücut tepkilerimi fark ederim

*=ters skorlanan madde

APPENDIX 6 Lymphedema Quality of Life Index

LENFÖDEM YAŞAM KALİTE ÖLÇEĞİ (KOL)

	Hiç (asla)	Biraz	Oldukça	Çok
1. Şiş kolunuz günlük yaşam aktivitelerinizi ne kadar etkiler?				
a) Mesleğiniz				
b) Ev işi				
c) Saç taramak				
d) Giyinmek				
e) Yazı yazmak				
f) Yemek yemek				
g) Yıkanmak				
h) Diş temizliği				
2. Şiş kolunuz boş zaman aktivitelerinizi ne kadar etkiler? Lütfen buna örnek yazınız				
3. Diğer insanlara ne kadar bağlı kalmak zorundasınız ?				
4. Şiş kolunuzun görünümünüzü ne kadar etkilediğini hissediyorsunuz ?				
5. Kendinize uygun kıyafetler bulmakta ne kadar zorlanıyorsunuz ?				
6. Giymek istediğiniz kıyafetleri bulmakta ne kadar zorlanıyorsunuz ?				
7. Şiş kolunuz kendiniz hakkında nasıl hissettiğinizi etkiler mi?				
8. Şiş kolunuz diğer insanlarla olan ilişkinizi etkiler mi?				
9. Lenfödeminiz ağrıya neden oluyor mu?				
10. Şiş olan kolunuzda uyuşma var mı?				
11. Şiş olan kolunuzda iğne batması, sıkışma veya karıncalanma hissine sahip misiniz?				
12. Şiş kolunuzda güçsüzlük hissi var mı?				
13. Şiş kolunuzda ağırlık hissi var mı?				
14. Yorgun hissediyor musunuz?				
15. Geçen hafta içinde uyku sorununuz var mıydı?				
16. Geçen hafta içinde bir şeyler üzerine konsantre olmakta zorlandınız mı?				
17. Geçen hafta içinde gergin hissettiniz mi?				
18. Geçen hafta içinde endişeli hissettiniz mi?				

APPENDIX 6 Lymphedema Quality of Life Index

	Hiç (asla)	Biraz	Oldukça	Çok
1. Geçen hafta içinde huzursuz hissettiniz mi?				
2. Geçen hafta içinde depresyonda hissettiniz mi?				

Genel olarak yaşam kalitenizi şu anda nasıl değerlendirirsiniz? Lütfen aşağıdaki ölçekte puanınızı işaretleyiniz.

0 1 2 3 4 5 6 7 8 9 10

Kötü **Mükemmel**