



# Can yoga have any effect on shoulder and arm pain and quality of life in patients with breast cancer? A randomized, controlled, single-blind trial



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## ABSTRACT

**Objective:** To examine the effects of yoga on shoulder and arm pain, quality of life (QOL), depression, and physical performance in patients with breast cancer.

**Methods:** This prospective, randomized study included 42 patients. The patients in Group 1 underwent a 10-week Hatha yoga exercise program. The patients in Group 2 were included in a 10-week follow-up program. Our primary endpoint was arm and shoulder pain intensity.

**Results:** The group receiving yoga showed a significant improvement in their pain severity from baseline to post-treatment, and these benefits were maintained at 2.5 months post-treatment. When compared to the control group, there were no statistically significant differences between the 2 groups with respect to the parameters assessed at the end of week 10.

**Conclusion:** Yoga was an effective and safe exercise for alleviating shoulder and arm pain, which is a complication with a high prevalence in patients with breast cancer.

## 1. Introduction

Breast cancer is the most common type of malignancy in women across the globe and nearly 1.68 million new cases are diagnosed annually [1]. Breast cancer may lead to many problems associated with the disease itself or its treatment resulting in quality of life (QOL) being negatively affected [2].

Pain is among the most frequently seen complications after breast cancer treatment [3]. In particular the pain occurring in the shoulders and arms after a breast surgery is one of the major musculoskeletal problems and is often linked to an increase in disability and emotional and psychological distress [4]. It has been stated in a review about breast cancer survivors, published by Montazeri [5], that shoulder and arm pain are among the most common problems in these patients which negatively affects their QOL. Despite this being such a widespread problem, there is inadequate information in the literature dealing with shoulder and arm pain in breast cancer.

With its breathing exercises, flexibility, and relaxation components, yoga is a gentle mind-body exercise program which is being studied today regarding properties that would qualify it as a complementary or alternative therapy for patients with cancer [6]. Recent studies mention

that yoga has positive effects on symptoms during both primary treatment and afterward in patients with breast cancer [7–10]. The recent guidelines published by the Society for Integrative Medicine to alleviate symptoms for patients with breast cancer state that yoga is effective in relieving anxiety and mood disorders (grade A recommendation), and improving impaired QOL (grade B recommendation) [11]. However, when we look at the studies performed on this subject, we see that there are just a few studies investigating the effect of yoga on the pain of the general musculoskeletal system in patients with breast cancer [8,12]. Moreover, the fact that only a small number of randomized controlled studies have been made on pain treatment raises a confidence problem in relation to the quality of such studies. We also see that it is mostly the short-term effects of yoga that have been investigated in those studies.

Given the inadequacy of the studies on the effect of exercise on shoulder and arm pain in patients with breast cancer, our primary aim in this study was to assess the effect of a 10-week Hatha yoga program on the shoulder and arm pain symptoms of patients with breast cancer, to compare them to the control group, and to explore whether yoga has a long-term effect on pain following the completion of the yoga therapy.

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## 2. Materials and methods

This prospective, randomized, controlled, single-blind study included patients with breast cancer aged 18 to 65 years who had presented to the medical oncology and support outpatient clinics of our university and whose treatments were completed.

The *inclusion criteria* were being free of any recurrent or progressive disease, being female, having completed surgical treatment, radiotherapy, and/or chemotherapy, and agreeing to take part in the study.

The *exclusion criteria* were serious cardiac disease, uncontrolled hypertension, acute or chronic respiratory disease, infection, any disease affecting mental or cognitive function, major depression, a musculoskeletal system disease hindering participation in exercise, and having taken part in a regular exercise program in the past 6 months.

## 3. Patients

Eighty-five patients who presented to our outpatient clinic were evaluated in terms of the inclusion and exclusion criteria. Fifty-two patients were found suitable for the study. Ten patients were excluded for failing to appear at their first examination appointments. Finally, 42 patients were included in the study (Fig. 1).

A patient questionnaire was used to obtain demographic data. History of the disease was extracted from the patient records. The patients recruited were provided with written and verbal information about the purpose, length, implementation, and possible side effects of the study, and the problems that could arise.

## 4. Outcome measures

The following assessments were performed for all the patients before and after treatment. All of the patients in Group 1 and 14 of those in Group 2 attended their post-treatment visits. One patient in Group 1 could not attend the assessment at month 5 due to the loss of her husband, and only 2 patients attended at month 5 from the entire Group 2; the others were not willing to attend the follow-up visits (Fig. 1). For this reason, only the pre-treatment and post-treatment data could be compared between the 2 groups and the data pertaining to month 5 could be compared only within Group 1 (the yoga group). Patient measurements were performed by a physician unaware of the treatment.

**Visual analogue scale (VAS);** To assess pain intensity at rest, we used the 100 mm visual analog scale. Patients marked their subjective pain intensity at rest and during movement on a 100 mm visual analog scale table [13].

**The European Organization for Research and Treatment of Cancer Quality of life (EORTC QLQ-C30) questionnaire;** This survey was conducted for evaluating the quality of life in patients with breast cancer and consists of 30 questions and assesses symptoms that occurred during the previous 2 weeks. The questionnaires are divided into 3 scales: global health scale (GHS), functional scale (FS) and symptom scale (SS). High scores for functional and global health scales indicate a good quality of life while high scores on the symptom scale represent a high level of problems [14].

**The Beck Depression Inventory (BDI);** The BDI was used to assess the depression levels of the patients. It evaluates 21 symptoms of depression. Higher scores indicate more severe depression. The validity and reliability of the Turkish version have been previously verified [15].

**Six minute walk test (6MWT);** Walking endurance was assessed using a 6-minute walk. Participants walked up and down a 20 m hallway for a period of 6 min, and the distance walked by each subject was recorded [16].

**Evaluation of edema;** Lymphedema of the limbs was assessed by using circumferential and volumetric methods. Circumferential upper limb measurements were carried out with the arm abducted at 30°,

starting at the level of the carpometacarpal joint, every 5 cm proximal to this point along both limbs.

## 5. Intervention

The 42 patients were randomized into 2 groups based on a random numbers table as Group 1, the yoga exercise group (n = 22) and Group 2, the control group (n = 20) (no intervention and given usual care). The patients in Group 1 were included in a 10-week Hatha yoga program and those in Group 2 in a 10-week follow-up program. The Group 1 patients attended the yoga exercise program supervised by a certified trainer 2 days a week, each lasting 1 h, for a period of 10 weeks. This yoga class was taught at a beginners' level. The women in this study had no previous experience of yoga. Because of the advanced age of many of the women and the physical challenges of aging, the class was taken at a slower pace than would be expected for a younger group without these considerations. Each class was started with a check-in period to discuss any questions or concerns and this discussion was followed by 5 min of seated meditation and then by 10 min of *shavasana* which is a lying down restorative pose.

The following types of poses were included during the course: standing poses included mountain pose (*tadasana*), chair pose (*utkata-sana*), extended triangle pose (*utthita trikonasana*), extended side angle pose (*utthita parshvakonasana*), warrior 1 (*virabhadrasana 1*), warrior 2 (*virabhadrasana 2*), and tree pose (*vrikshasana*). Because of lymphedema, chest and shoulder opening poses were emphasized more in this yoga class. The poses included were the raised arms pose, arms overhead and parallel (*urdhva hastasana*), cow face pose (*gomukhasana*), bridge pose (*setu bandha sarvangasana*), supine pectoralis muscle stretches on a blanket, and supine twists. A relaxing music was played during trainings. At the end of each session, the patients were covered with a thin blanket while in the resting position, and a lavender eye patch was placed on their eyelids.

All patients (Group 1 and Group 2) were informed about breast cancer, lymphedema (and methods of protection from lymphedema), and coping with the activities of daily living; they were also given a booklet containing all the relevant information plus the illustrations of the exercises. The exercises in this booklet consisted of a range of motion for the joints and stretching and breathing exercises, which were which were prepared according to lymph circulation. All patients were asked to practice these exercises in the booklet at home twice as a standard treatment. The rate of adhering to the treatment in the yoga group was as high as 95.45% throughout the treatment.

## 6. Ethical considerations

This study was approved by the Ethical Committee of our university (Decision number: 14–11/7). All patients and controls gave written informed consent.

## 7. Statistics

The data were analyzed using software SPSS version 20.0. The results of variables were summarized as mean  $\pm$  standard deviation. The differences between the treatment methods with respect to quantitative variables were assessed using the Kruskal-Wallis test and the differences between the treatment methods with respect to categorical variables using the Pearson Chi-Square test. Comparisons of pre treatment-versus post-treatment values for continuous variables were made using a paired t-test. The Wilcoxon signed rank test was performed to determine whether there was any difference between the patients' pre-treatment volumes and post-treatment volumes. A p-value of less than 0.05 was considered significant.

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