

Effects of 8 weeks of combined forest exercise on quality of life and physical self-concept of breast cancer survivors

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Abstract

The purpose of this study was to investigate the effect of 8 weeks of forestry exercise on the quality of life and physical self-concept of breast cancer survivors. The subjects of this study were eight breast cancer survivors 6 months after mastectomy. The forest combined exercise program consisted of aerobic exercise through forest walking and resistance exercise using elastic bands. The forest combined exercise was conducted twice for 8 weeks. Forest trekking consisted of a 2km walking speed and resistance exercise consisted of three levels of sets and intensity. The format was divided into gradual increases. The exercise time was 40 to 60 minutes for forest trekking, 20 to 30 minutes for descent, and 40 to 60 minutes for resistance exercise, for a total of 120 to 130 minutes per day. Breast cancer survivors' quality of life was measured using a questionnaire, and changes in quality of life were measured using a t-test ($\alpha=.05$). Physical self-concept was assessed through in-depth interviews. There was no statistically significant difference in quality of life before and after 8 weeks of combined forestry exercise, but there was a slight tendency to increase in the area of physical well-being. Physical self-concept showed positive changes in motivation, physical strength improvement, health promotion, physical competence, and self-confidence through the forest composite exercise. Therefore, the forest composite exercise is believed to have a positive effect on the physical self-concept of breast cancer survivors.

Keywords: Forest Complex Exercise, Quality of Life, Physical Self-concept

1. Introduction

In Korean women, breast cancer is the second most common disease after thyroid cancer, and it is increasing every year [1]. Breast cancer treatment includes surgery, radiation therapy, and chemotherapy, and prevents metastasis and recurrence of cancer cells by removing not only the breast but also the surrounding lymph [2].

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Advances in medical technology have made early detection possible faster than before, and the survival rate after 5 years reaches 80%, but breast cancer survivors complain of various aftereffects [3]. Previous studies have reported that the sequelae of physical problems cause muscle weakness, joint range of motion, and limitations in daily life, which lead to a decrease in physical strength [4, 5]. Although strength training has important benefits for improving fatigue, depression, and quality of life [6], it has been excluded in the past due to the perception that it may cause lymphatic swelling compared to aerobic training [7]. Recently, many studies have been published on the positive aspects of resistance exercise for breast cancer patients, and it has begun to be included in exercise programs for appropriate rehabilitation of breast cancer patients [8, 9]. However, it is difficult for cancer patients with low physical strength to comply with the level of physical activity recommended for the public, and previous studies have reported that only about one-third of actual breast cancer survivors were able to perform a general level of physical activity [10]. Various activities in the forest can serve as a means of physiological and psychological treatment. Forest exercise programs utilize forest environmental factors to reduce stress hormones [11] and include vertical movements such as climbing or descending sloping terrain to improve physical strength [12]. In this way, forestry exercises are known to maintain health and are implemented for the purpose of disease prevention and health promotion.

Therefore, this study seeks to determine the effects of 8 weeks of forestry exercise on the quality of life and physical self-concept of breast cancer survivors.

2. Research method

2.1 Research subject

This study targeted 8 breast cancer survivors living in City C, and the inclusion criteria for the study subjects were patients diagnosed with breast cancer suggested in this study and 6 months after mastectomy. All subjects were selected as volunteers who agreed to the purpose of the study and the contents of the experiment and were selected as those who could participate in the forest complex exercise for 8 weeks. The characteristics of the study subjects are as shown in Table 1.

Table 1. Subject characteristics

	n	Age	Height(cm)	Weight(kg)	muscle mass(kg)	Body fat(%)
breast cancer survivor subject	8	50.38±6.37	163.33±7.81	62.08±10.03	22.17±2.55	33.15±8.47
	Clinical characteristics					
A	Diagnosed with stage 3 left breast cancer. After complete left resection, chemotherapy and radiation therapy were administered. One year and three months have passed since the end of chemotherapy. One year and one month has passed since the end of radiotherapy. Currently taking antihormonal medication.					
B	Diagnosed with stage 2 right breast cancer. After complete right resection surgery, chemotherapy was administered. 8 months have passed since the end of chemotherapy. Currently taking antihormonal medication.					
C	Diagnosed with stage 1 left breast cancer. After left partial resection surgery, chemotherapy and radiation therapy were administered. Two years and three months have passed since the end of chemotherapy. Currently taking antihormonal medication.					
D	Diagnosed with stage 2 right breast cancer. After complete right resection surgery, chemotherapy and radiation therapy were administered. 8 months have passed since the end of chemotherapy. Six months have passed since the end of radiotherapy. Currently taking antihormonal medication.					

E	Diagnosed with stage 1 left breast cancer. Radiation therapy was performed after left partial resection surgery. One year and three months have passed since the end of radiotherapy.
F	Diagnosed with stage 1 left breast cancer. After complete right resection surgery, chemotherapy was administered. Seven months have passed since the end of chemotherapy.
G	Diagnosed with stage 1 left breast cancer. After complete left resection, chemotherapy was administered. 9 months have passed since the end of chemotherapy.
H	Diagnosed with stage 1 left breast cancer. After left partial resection surgery, chemotherapy was administered. 10 months have passed since the end of chemotherapy.

M±SD

2.2 Forest Complex Movement

The forest combined exercise program is a complex form of aerobic exercise and resistance exercise. The program is performed using an elastic band after hiking, and is divided into three stages per week, gradually increasing the intensity. The exercise movements include band exercise and the gradual step-by-step training variables and programs of the forest complex exercise program are shown in Table 2.

Table 2. Forest complex exercise method

Trekking	Stage1 (1-2 W)	Stage2 (3-5 W)	Stage3 (6-8 W)	resistance movement	stren gth	Stage1 (1-2 W)	Stage2 (3-5 W)	Stage3 (6-8 W)	Part	Exercise	
Hiking trail	Mt. T hiking trail			Reps		20	20	20	Shoulder	External, Internal Rotation	Band Shoulder press
Distance	2km round trip			Set		1-2	3	5	Arm	Biceps curl	Triceps kickback
Altitude	358m			Rest time between sets	Thera Band (RED)	30s	30s	30s	Chest	Chest press	Chest fly
Hiking time	60min	50min	40min	Rest time for each event		4min	3min	2min	Back muscles	Behind pulldown	Bent Over Row
Descent time	30min	20-30min	20-30min	Total exercise time		40min	50min	60min	Lower body	Squat	Lunge Deadlift

2.3 Quality of Life Measures (QOL-CS)

In this study, we used a modified version of the Quality of Life - Cancer Survivor, QOL-CS (breast cancer version), which was developed for cancer survivors [13]. This tool consists of a total of 46 questions in physical, psychological, social, and spiritual domains, and each domain includes corresponding problems. Scores are measured from 0 to 10, with higher values indicating better quality of life. In this study, quality of life was evaluated by analyzing the average of the summed scores of each domain.

2.4 Physical self-concept in-depth interview

In-depth interviews with participants were conducted through oral interviews for approximately one hour [14]. Research participants were asked to describe their experiences orally without as much interference from the researcher as possible. The in-depth interview was conducted in the form of a personal interview, and

questions were asked in simple sentences to supplement the content of the survey questions, which are a quantitative research tool. Interviews were conducted regarding the motivation for starting the forest composite movement, awareness of the forest composite movement, psychological and physical changes after the forest composite movement, health improvement, physical strength improvement, and satisfaction, etc. The in-depth interview questions are shown in Table 3.

Table 3. In-Depth Interview Questions

No.	Question content	No.	Question content
1	What was the purpose of starting the forest integration movement?	6	How did you like the forest complex exercise program?
2	Have you adapted well to the forestry complex exercise?	7	Have you seen any changes in yourself after the Forest Complex Movement?
3	What do you think are the characteristics of the forestry movement?	8	How was your relationship with the participants during the forest complex movement?
4	Are there any changes in physical strength and weight after forestry complex exercise?	9	Are there any changes in your daily life after the Forest Complex Movement?
5	Are there any changes in your health after the Forest Complex exercise?	10	How did you feel after the forest complex exercise?

2.5 Statistical Analysis

Data processing for this study was analyzed using the IBM SPSS Statistics (Ver 22.0) statistical program, and all data were subjected to a paired-sample t-test by calculating the mean and standard deviation. The statistical significance level was set at $\alpha=.05$.

3. Result

3.1 Quality of Life Measures (QOL-CS)

Changes in quality of life according to pre- and post-measures of breast cancer survivors' forestry exercise are shown in Table 4. There were no significant differences in any of the physical, psychological, and social well-being domains, but the physical domain showed a tendency to increase after compared to before.

Table 4. Changes in QOL-CS of breast cancer survivors

	area	Pre	post	t	p
QOL-CS	physical area	4.56±1.88	5.38±1.05	-.987	.356
	psychological domain	6.18±0.67	6.34±0.94	-.918	.389
	social sphere	5.52±0.46	5.56±1.61	-.062	.952

M±SD

3.2 Changes in physical self-concept

Changes in physical self-concept through the forestry complex exercise were analyzed through in-depth interviews, and 6 of the 8 women who participated in the program were analyzed who agreed to in-depth interviews. Although the subjects showed differences of opinion depending on the individual, they generally achieved positive effects in both physical and mental aspects and were motivated to practice forestry combined

exercise. The results of analyzing physical self-concept through forestry complex exercise are shown in Table 5.

Table 5. Changes in physical self-concept

subject	Detail	subject	Detail
motivation	<ul style="list-style-type: none"> ▪Expectations for recovery of health ▪Improvement of health and physical strength of participants 	Physical competence	<ul style="list-style-type: none"> ▪Improvement of motor function ▪Trying new body movements
Improved physical strength	<ul style="list-style-type: none"> ▪Improved muscle strength, cardiorespiratory capacity, and flexibility ▪Reduced fatigue after daily activities 	Increased confidence	<ul style="list-style-type: none"> ▪Improvement of physical strength, weight loss, increased confidence ▪Increased self-esteem through skill in exercise movements ▪Increased confidence through encouragement from colleagues and family
health promotion	<ul style="list-style-type: none"> ▪Improvement of muscle joint function ▪Improvement of after-effects symptoms after surgery 		

4. Discussion

Forest-based exercise positively impacts the physical self-concept of breast cancer survivors. Participants enjoy activities like forest trekking and elastic band exercises, enabling sustained engagement in physical activity. Moreover, witnessing improvements in health and fitness motivates them to continue exercising. This motivation fosters consistent participation in forest-based exercise, leading to overall enhancement of physical fitness. Additionally, participants experience reduced musculoskeletal sequelae and increased stamina, resulting in less fatigue during daily activities. Therefore, forest-based exercise serves as an effective program for improving physical fitness in breast cancer survivors. The results of this study showed no statistically significant difference, but based on in-depth interviews with the subjects, it is believed to be an exercise program that causes positive improvement in condition. Study participants experienced improvements in physical self-efficacy due to increased stamina and mastery of exercise movements. After surgery, I regained my stamina and strength, allowing me to perform daily activities and exercise more easily. These improvements increased their confidence and self-esteem in their abilities. Physical self-concept can be positively influenced by the ongoing motivation and participation in exercise, indicating a cyclical motivation that can lead to positive outcomes [15]. Research suggests that physical self-concept can change even within a short period of time [16], and this study indicates that 8 weeks of forest-based exercise for breast cancer survivors has a positive impact on physical self-concept.

5. conclusion

The purpose of this study is to analyze the effects of 8 weeks of forest complex exercise on breast cancer survivors' quality of life, physical activity index, leisure competence, exercise satisfaction, exercise self-efficacy, and intention to continue exercising. The goal is to find out the psychological effects that occur.

First, there was no statistically significant difference in the quality of life of breast cancer survivors for each item, but the psychological well-being showed relatively high values compared to previous studies.

Second, there were positive changes in physical self-concept in motivation for forestry training, physical strength improvement, health promotion, physical competence, and confidence.

Therefore, Forest complex exercise showed relatively positive results on the psychological well-being of breast cancer survivors' quality of life and is believed to have a positive effect on physical self-concept.

In the future, various studies on forestry movement and various cancer survivors are expected.

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