

# Influence of an Adapted Physical Activity Program on Self-Esteem and Quality of Life of Breast Cancer Patients after Mastectomy

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### Keywords

Breast cancer · Mastectomy · Physical activity · Self-esteem · Quality of life

### Abstract

This study aimed to assess the influence of an adapted physical activity program on self-esteem and quality of life in breast cancer patients. Twenty-three women diagnosed with breast cancer and treated by mastectomy formed 2 groups. The experimental group practiced adapted physical activity for 12 weeks, while the control group did not. All participants answered questionnaires regarding their self-esteem and quality of life at the beginning of the program and 6 and 12 weeks after that. Self-esteem, physical self-perception, quality of life, global health status, pain, and breast symptoms were improved only in the group which practiced adapted physical activity.

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### Introduction

The number of individuals diagnosed worldwide with cancer has been estimated to 10 million, while 25 million more have survived cancer [1]. In France, with 54,000 new cases each year, breast cancer is the most common cancer (33.5% of all diagnosed cancers [2]).

Breast cancer and associated treatments have many psychological and physical adverse effects on women. Indeed, breast cancer is usually associated with pain, decreased upper body mobility, and weakness and alters the quality of life of women (e.g., [3]). Moreover, breast cancer and mastectomy deeply upset and threaten the identity of women and impact their body image and self-esteem [4, 5]. These phenomena are linked as it has been reported that a lower body image was linked to greater depression and poorer quality of life [6]. Finally, quality of life and body image seem important to consider in breast cancer, as disturbances in these factors could affect survivorship [7].

Physical activity has been shown to improve physical fitness, body composition, self-confidence, and quality of

life of cancer patients [8]. Concerning this topic, Knobf et al. [9] also reported that physical activity is useful in maintaining or improving self-esteem in cancer patients. However, the specific impact of adapted physical activity (APA) on both self-esteem and quality of life after breast surgery needs further exploration.

So, the aim of the present study was to assess the influence of an APA program on self-esteem and quality of life in breast cancer patients.

## Materials and Methods

### Participants

Women diagnosed with breast cancer were invited to take part in the study during the medical consultation with their oncologist at the Clinique Victor Hugo in the city of Le Mans, France. Those who accepted to participate were randomly allocated either to the experimental group (EG) or to the control group (CG).

### Inclusion and Exclusion Criteria

To be included, participants had to (a) be older than 18 years old; (b) have undergone a breast mastectomy (with or without immediate breast reconstruction) up to 15 months prior to the beginning of the study; (c) to be under cancer treatment; and (d) to have answered all questionnaires (completion rate 100%). To be included in the EG, participants had to follow at least 11 out of the 12 sessions of the APA program. To be included in the CG, participants had not to practice any APA for the duration of the study. Patients with neuropsychiatric disorders, cognitive impairments, under treatment for another chronic pathology, or unable to perform physical activity were excluded from the study.

A total of 34 (17 in each group) women diagnosed with breast cancer volunteered to take part in the study. However, 11 participants were excluded from the final analysis. One did not partake in enough APA sessions, 2 had a relapse, and 8 dropped out because of distance and side effects. Finally, the EG was composed of 13 participants and the CG of 10 participants (Table 1).

All participants were informed about the purpose and the procedures of the study and signed an informed consent form. The study was conducted according to the Declaration of Helsinki and was approved by the local ethics committee on human research.

Although the sample size was limited by patients' availability, we did some power calculations. We aimed to detect a 6% score difference between groups at a power of 80% in order to be able to reject the null hypothesis that there is no time or group effect (type I error of 0.05). Using the literature, we determined that this required a sample size of 23 participants divided into the EG and CG [10]. Consequently, considering the number of possible dropouts during the study, we inflated this required sample size and recruited 34 participants.

### APA Program

The APA program consisted of 1 APA session per week for 12 weeks. Each session lasted for 1 h and focused on muscle strengthening, balance, and flexibility exercises.

**Table 1.** Demographic characteristics

	EG (n = 13)	CG (n = 10)
Anthropometry		
Age, years	51±2	53±4
Height, cm	163±3	162±6
Weight, kg	70±17	72±17
Marital status		
Married	10 (77)	6 (60)
Living together	1 (8)	0 (0)
Single	0 (0)	1 (10)
Divorced	2 (15)	2 (20)
Widow	0 (0)	1 (10)
Education		
No qualification	0 (0.0)	1 (10)
Secondary school	2 (15)	2 (20)
High school	6 (46)	4 (40)
University degree	5 (38)	3 (30)
Time since mastectomy, months		
	8±4	10±3
Treatment		
Chemotherapy	13 (100)	10 (100)
Radiotherapy	12 (92)	10 (100)
Hormonotherapy	12 (92)	10 (100)
Herceptin	1 (8)	0 (0)

Data are given as means ± standard deviations or n (%). EG, experimental group; CG, control group.

### Questionnaires

Participants' self-esteem was assessed using a global questionnaire, the Rosenberg questionnaire, and a questionnaire more oriented toward the physical domain adapted from the Physical Self-Perception Profile [11], the ISP-25. Quality of life was assessed using a questionnaire developed for cancer patients, the EORTC QLQ-C30, and a more specialized questionnaire about breast cancer, the EORTC QLQ-BR23. Participants answered the questionnaires with similar conditions 3 times: at their first admission to the clinic for the CG and before the APA program for the EG (T0) and 6 weeks (T6) and 12 (T12) weeks after T0 for both groups.

### Statistical Analysis

The normality of the distribution was tested using the Kolmogorov-Smirnov test. Then, two-way analyses of variance (ANOVAs) for repeated measures were used to assess the effects of group (EG and CG) and time (T0, T6, and T12) on the questionnaire scores.

## Results

A brief overview of the participants' demographic characteristics is provided in Table 1. Women in the EG participated in a mean of  $11.7 \pm 0.5$  APA sessions out of the 12 sessions of the APA program (98%).

### *Self-Esteem (Rosenberg Questionnaire)*

For the EG, self-esteem increased by 8% at T6 and by 11% at T12 (T0:  $30.6 \pm 6.5$ ; T6:  $33.1 \pm 5.7$ ; T12:  $33.9 \pm 4.9$ ;  $p < 0.05$ ), while it did not change for the CG.

### *Self-Esteem (Physical Domain, ISP-25)*

Physical self-perception increased by 35% between T0 ( $3.22 \pm 1.05$ ) and T12 ( $4.34 \pm 1.11$ ) for the EG ( $p < 0.01$ ), while there was no improvement for the CG.

### *Quality of Life (QLQ-C30)*

For the EG, the global health status increased by 14% at T6 and by 18% at T12 (T0:  $59.0 \pm 17.1$ ; T6:  $67.3 \pm 7.9$ ; T12:  $69.9 \pm 15.0$ ;  $p < 0.05$ ), while it decreased by 9% for the CG ( $p < 0.05$ ).

Physical functioning increased by 11% for the EG after 12 weeks of APA (T0:  $83.6 \pm 12.6$ ; T12:  $92.8 \pm 7.9$ ;  $p < 0.05$ ). For the CG, this item decreased by 3% after 6 weeks ( $p < 0.05$ ) and remained constant afterwards.

Pain tended to decrease at T12 for the EG (T0:  $42.3 \pm 34.4$ ; T12:  $17.9 \pm 18.5$ ; -24%;  $p = 0.055$ ). No change was observed for the CG.

### *Quality of Life (QLQ-BR23)*

For the EG, breast symptoms decreased by 60% at T12 (T0:  $37.2 \pm 27.3$ ; T12:  $15.4 \pm 13.5$ ;  $p < 0.05$ ), while they increased by 77% for the CG ( $p < 0.05$ ).

## **Discussion**

The aim of this study was to assess the influence of an APA program on self-esteem and quality of life in breast cancer patients. Our results show that APA is beneficial for both parameters, while not practicing physical activity could be detrimental to breast cancer patients.

Overall, self-esteem and physical self-perception were significantly improved in the EG, emphasizing the role of APA. This was expected and could be related to the practice of aerobic and muscle-strengthening exercises which positively influence physical fitness, strength, and body image [11]. The role and usefulness of APA is underlined by the results of the CG for which self-esteem was not improved.

Positive effects of APA were also observed concerning quality of life. The EG showed benefits in several domains, such as global health status, physical functioning, pain, and breast symptoms. This suggest that APA could be a useful tool to fight against the detrimental effects of cancer surgery and treatments that negatively affect qual-

ity of life, such as reduced arm range of motion [12] and pain [13]. Moreover, the important role of APA is reinforced by the negative results of the CG and suggests that performing physical activity is not only beneficial for breast cancer patients but that not performing physical activity is detrimental to patients.

A possible limitation of this study is the reliance on questionnaires that are subjective measurement tools. Nevertheless, the studied topics can only be assessed this way, and we used validated questionnaires common in this field of research. Another limitation could be the relatively limited number of participants, but the power calculations revealed that it was enough to show significant differences, as illustrated by our results. Moreover, despite a substantial proportion of patients dropping out, the baseline features remained balanced between the groups. Finally, the fact that all participants came from the same clinic could result in bias for the study's external validity.

## **Conclusion**

APA is an efficient tool to improve self-esteem and quality of life of breast cancer patients. Moreover, APA should be strongly recommended, as not practicing physical activity seems to negatively influence several domains, such as physical functioning, pain, and breast symptoms.

## **Statement of Ethics**

The study was conducted according to the Declaration of Helsinki and was approved by the local institutional ethics committee on human research.

## **Disclosure Statement**

There is no conflict of interest.

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