

# Physical activity during and after adjuvant chemotherapy in patients with breast cancer

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## Abstract

**Objectives** To describe changes in physical activity levels related to health-enhancing physical activity guidelines during and after adjuvant chemotherapy in a cohort of Swedish patients with breast cancer.

**Design** Exploratory clinical prospective longitudinal study with 6 and 12 months of follow-up.

**Participants** Forty women treated for breast cancer with adjuvant chemotherapy were included, and 33 women completed the study.

**Main outcome measures** The primary outcome was the proportion of participants meeting the health-enhancing physical activity guidelines, both in relative terms (perceived exertion using Borg's rate of perceived exertion scale) and absolute terms (metabolic equivalent).

**Results** The proportion of participants meeting the guidelines when leisure-time physical activity was measured in terms of absolute intensity was 81 (25/31) to 94% (31/33) during chemotherapy, 93% (29/31) at 6-month follow-up and 87% (26/30) at 12-month follow-up. Women who had been physically active before their cancer diagnosis and women who had received information about physical activity were more physically active during chemotherapy.

**Conclusions** Swedish patients with breast cancer are generally more physically active during adjuvant chemotherapy than has been reported previously in international studies. Physical activity habits prior to cancer diagnosis and information about the benefits of physical activity appear to be important factors for higher levels of physical activity during and after chemotherapy.

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**Keywords:** Breast cancer; Breast Neoplasms ;Physical activity; Motor Activity ;Exercise; Chemotherapy; Adjuvant

## Introduction

Breast cancer is the most common cancer in women in Western countries. In addition to surgery, where all detectable disease is removed, adjuvant treatment is often administered if a statistical risk of relapse remains due to occult disease. Adjuvant treatment may consist of radiotherapy, chemotherapy and hormonal therapy depending on tumour stage and biological features (e.g. hormonal receptor status). The risk of tumour recurrence and breast cancer mortality is reduced through adjuvant treatment [1]. Side-effects of

chemotherapy are both physiological and psychological, and include decreased physical function, nausea, vomiting, fatigue and decreased well-being [2,3]. Some of these side-effects have been seen to be reduced with physical activity [2–4]. In a recent systematic review and meta-analysis of physical activity during and after cancer treatment, Speck *et al.* included 66 controlled intervention studies, most of which were in patients with breast cancer. They concluded that the benefits of physical activity are similar in patients with cancer and persons without cancer, and that exercise during or shortly after treatment appears to be safe [3]. Additionally, it has been demonstrated that the risk of breast cancer recurrence and mortality is reduced by physical activity [5–8].

The most common interventions in studies performed during chemotherapy were aerobic exercise at moderate intensity

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(e.g. a brisk walk for 30 to 45 minutes, three to five times per week) [3]. This is in line with guidelines for health-enhancing physical activity, such as the American guidelines recommending 30 minutes of moderate-intensity aerobic physical activity on 5 days per week (i.e. 150 minutes per week) or vigorous-intensity aerobic physical activity for at least 20 minutes on 3 days per week for healthy adults [9,10]. The National Institute of Public Health in Sweden, where the present trial was performed, has recommended that all individuals should undertake at least 30 minutes of exercise of at least moderate intensity per day. This corresponds to energy expenditure of 150 kcal per day or approximately 1000 kcal per week [11].

Studies that have described physical activity before, during and after cancer treatment report a decline in the level of physical activity after cancer diagnosis, especially during treatment [12,13]; approximately 50% of patients are insufficiently active according to guidelines following a diagnosis of cancer [14–17]. These previous studies used questionnaires to collect information on patients' physical activity. These were designed in different ways; in some studies, patients reported whether or not they exercised during chemotherapy [13], and in other studies, the patients were asked retrospectively about physical activity in a typical week [15,16]. However, to the authors' knowledge, no studies to date have determined patients' experiences of exertion and its relationship with physical intensity and level.

As such, this study was designed to monitor physical activity prospectively using a diary to collect detailed physical activity data several times during and after chemotherapy. The information from these diaries was used to calculate not only the level of physical activity, expressed as metabolic equivalents (METs), but also perceived exertion using Borg's rate of perceived exertion (RPE) scale, which has not been used previously in patients undergoing chemotherapy. The main reason for including this analysis is that perceived exertion is frequently used in clinical practice when prescribing physical activity to patients in general.

## Materials and methods

### Study participants

This clinical prospective study was conducted from April 2008 to May 2009. A convenience sample of 49 consecutive patients with breast cancer was identified at the Department of Oncology at Skåne University Hospital, where they had been referred for adjuvant postoperative chemotherapy. Inclusion criteria were: (1) women with breast cancer; (2) planned adjuvant chemotherapy; (3) aged  $\geq 18$  years; and (4) could understand and speak Swedish. Women were excluded if they had: (1) limited walking capacity; or (2) cognitive dysfunction. Eight patients declined to participate and one was excluded because of limited walking capacity. In total, 40 patients were included, 33 of whom completed physical

Table 1  
Patient characteristics.

	Patients <i>n</i> = 33
Age, years	
Median (range)	50 (33 to 66)
Stage of cancer, <i>n</i> (%)	
I	9 (27)
II	17 (52)
III	7 (21)
Chemotherapy, <i>n</i>	
EC	11
EC-Doce	13
FEC	1
FEC-Doce	3
FEC-Doce-Trast	3
EC-Doce-Trast	2
Other treatment, <i>n</i> (%)	
Radiotherapy	20 (61)
Hormonal therapy	
Aromatase inhibitors	9 (27)
Tamoxifen	8 (24)
Meeting guidelines for health-enhancing physical activity in the year before inclusion, <i>n</i> (%)	17 (52)

EC, epirubicin; C, cyclophosphamide; Doce, docetaxel; F, 5-fluorouracil; Trast, trastuzumab.

activity registration at two or more of the four planned occasions during chemotherapy. Thirty patients also participated at 6- and 12-month follow-up. Tumour stage distribution and oncological treatments are summarised in [Table 1](#).

### Procedure

Eligible patients received an information letter and were subsequently contacted by telephone. All those interested in taking part in the study were included. During the telephone call, information was gathered about whether they had exercised regularly over the previous year. All participants signed an informed consent form that had been approved by the Advisory Committee on Research Ethics in Health Education (VEN A7-08). Information on diagnosis, disease stage and chemotherapy regimen was collected from the patients' medical records.

Physical activity diaries and pre-paid envelopes were posted to the participants. The participants started to fill in their diary the same week or the week after they started chemotherapy. Physical activity was subsequently reported every fifth week during the treatment period, and 6 and 12 months after the end of treatment. A question about whether the patient had received information about physical activity was sent to the participants together with the second physical activity diary.

### Measurements

#### Physical activity prior to inclusion

Patients were asked about regular sessions of physical exercise lasting for at least 30 minutes during the year prior to study inclusion (i.e. walking, aerobic exercise or biking) [18].

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