A meta-analysis of aerobic exercise interventions for women with breast cancer

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CRD summary
The authors concluded that aerobic exercise during or after adjuvant therapy appeared to be an effective means of improving cardiopulmonary function and reducing percentage body fat in women with breast cancer. Given the possibility of publication and language bias, and the small number of trials included for meta-analysis, the reliability of the authors’ conclusions is unclear.

Authors' objectives
To assess the impact of aerobic exercise interventions on cardiopulmonary function and body composition in women with breast cancer.

Searching
PubMed and CINAHL were searched from 1985 to June 2007 for articles published in English. Search terms were reported. Unpublished studies were excluded from the review.

Study selection
Parallel controlled trials of aerobic exercise interventions (lasting at least four weeks) in women with breast cancer, that measured cardiopulmonary function and/or body composition, were eligible for inclusion. Included trials were required to have a minimum of five participants. Trials including interventions that were solely weight training, movement therapy, flexibility or stretching exercises were excluded. Trials were excluded if they were pilot studies, if there was obvious bias in the allocation to intervention or control groups, or if the effects of an exercise intervention could not be separated from a multiple intervention.

Included trials assessed moderate intensity aerobic exercise only (cycle, ergometre, walking, or aerobic exercise) or aerobic and resistance exercise interventions, with a median duration of 30 to 40 minutes per session and a median frequency of three times weekly, compared with control groups continuing with their usual lifestyle. In one trial, the control group participated in discussions about routine care of breast cancer; another control group participated in stretching exercise only. The duration of the interventions ranged from six to 26 weeks. Women in included trials underwent chemotherapy, radiotherapy or combined radio and chemotherapy adjuvant treatment; their mean age was 51.1 years; they had breast cancer stages 0 to III; their mean body mass index was 27.7kg/m².

Outcomes reported were absolute peak oxygen uptake, relative peak oxygen uptake, the distance covered in 12 minutes of brisk walking, body weight, percentage body fat, and lean body mass. The majority of the included trials were conducted in the USA; the remainder were carried out in the UK and Canada.

The authors did not state how the studies were selected for review.

Assessment of study quality
The methodological quality of the included trials was assessed using the Jadad Scale, a three item scale assessing randomisation, blinding and withdrawals/drop-outs, giving a maximum score of 5 points. Trials with a score of 3 or above were considered to be high quality.

Two reviewers independently assessed the methodological quality of the included studies. Consensus was reached through discussion.

Data extraction
Data on the post-intervention changes were extracted for each outcome and used to calculate the standardized mean difference (SMD) with 95% confidence intervals (CI) for each trial.
The authors did not state how many reviewers performed the data extraction.

**Methods of synthesis**

Effect sizes were pooled using a random-effects model. Statistical heterogeneity was assessed using the Q statistic. Sensitivity analyses were conducted according to high or low quality trials. Subgroup analyses were carried out to determine the impact of type of intervention, length of intervention and timing of intervention on outcomes.

**Results of the review**

Ten trials were included for the review (n=588 women from text, 621 women from tables). Six trials scored 3 points or above on the Jadad scale; four trials scored two or less, due to lack of blinding. Attrition rates ranged from 0 to 44.6% and the adherence rate ranged from 74.7 to 100%.

**Cardiopulmonary function**: In women with breast cancer, aerobic exercise interventions had a moderate to large effect on absolute peak oxygen uptake (SMD 0.92L/min, 95% CI 0.37 to 1.47; three trials), relative peak oxygen uptake (SMD 0.42mL/kg/min, 95% CI 0.10 to 0.75; two trials) and distance covered in 12 minutes of brisk walking (SMD 0.50m, 95% CI 0.20 to 0.80; three trials) compared with control groups.

**Body composition**: In women with breast cancer, aerobic exercise interventions significantly reduced the percentage body fat (SMD -0.89, 95% CI -1.43 to -0.36; three trials), but not body weight or lean body mass compared with control groups.

There was no evidence of significant statistical heterogeneity. The results of subgroup and sensitivity analyses were also reported.

**Authors’ conclusions**

Aerobic exercise during or after adjuvant therapy appeared to be an effective means of improving cardiopulmonary function and reducing percentage body fat in women with breast cancer.

**CRD commentary**

The review addressed a clear question with well-defined inclusion criteria. Two relevant databases were searched, so important data may have been missed. Restricting the review to published articles written in English meant that publication and language bias may also have been introduced. The validity assessment was conducted independently in duplicate. However, it was unclear whether similar steps were taken in the study selection or data extraction processes, so reviewer error and bias could not be ruled out.

The majority of included women were overweight and the studies were all conducted in English speaking Western countries, which made it unclear to what extent the results may be generalised to other women within a healthy weight range or to those in other cultures.

A validity assessment was performed and the majority of included trials appeared to have been of high quality. Suitable methods were used to combine the trials. Statistical heterogeneity was assessed and ruled out. The impact of trial quality on effect sizes was explored. However, the number of trials included for meta-analysis for each outcome was small and the number of participants was unclear, which undermined the reliability of the results.

Given the possibility of publication and language bias, and the small number of trials included for meta-analysis, the reliability of the authors' conclusions is unclear.

**Implications of the review for practice and research**

**Practice**: The authors stated that nurses should actively promote aerobic exercise to women with breast cancer, particularly providing information on the timing of the intervention, the advantages of combining aerobic and resistance training and the recommended frequency of exercise.

**Research**: Further research is needed evaluating the specific components of aerobic exercise programmes, the impact
on specific subpopulations and the long-term outcomes of these interventions.

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