The efficacy of exercise in reducing depressive symptoms among cancer survivors: a meta-analysis


CRD summary
The review concluded that exercise training provided a small overall reduction in depressive symptoms among cancer participants. Depressive symptoms were reduced to the greatest degree among breast cancer participants, among cancer participants aged 47 to 62 years, or when exercise sessions were supervised. The review was generally well conducted and the authors’ conclusions and recommendations appear reliable.

Authors’ objectives
To assess the efficacy of exercise to reduce depressive symptoms among cancer participants, and to examine the extent to which exercise dose and clinical characteristics of cancer participants influence the relationship between exercise and reductions in depressive symptoms.

Searching
PubMed, CINAHL Plus, PsycINFO, SPORTDiscus, OregonPDF in Health and Performance, and ProQuest were searched to November 2010. Search terms were reported. Four cancer journals were also searched. Reference lists of included articles were scanned.

Study selection
Randomised controlled trials (RCTs) of exercise interventions (with or without supervision) versus control (no exercise program prescribed and instructions to maintain current activity levels, or no exercise-related information) in adults diagnosed with any type and stage of cancer were eligible for inclusion. The primary outcome was depression.

The included trials studied exercise versus control in participants with breast (65% of trials), prostate, leukaemia, lymphoma, and colorectal cancer. Most of the exercise interventions occurred with concurrent curative treatment. The exercise interventions had an average of three sessions per week, with a mean duration of 13.2 weeks. Types of exercise included walking, stationary cycling, weight machine, resistance bands, flexibility training, and yoga. Exercises varied from low to moderate intensity; most were supervised. Trials assessed depression using the Centre for Epidemiologic Trials-Depression questionnaire, the Profile of Mood States, the Beck Depression Inventory, Hospital Anxiety and Depression Scale, or the Symptom Assessment Scale. Most trials were conducted in the USA. The age of participants ranged from 39 to 70 years (mean 51 years); most were Caucasian women.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
Trial quality was assessed using the PEDro scale to give a maximum score of 10.

Four reviewers independently performed the quality assessment.

Data extraction
Data were extracted on depression outcomes; these were used to calculate mean differences and 95% confidence intervals (CIs). Exercise intensity was estimated using metabolic equivalent units.

It appeared that four reviewers were involved in the data extraction.

Methods of synthesis
Fixed-effect and random-effects meta-analysis was undertaken to calculate pooled standardised mean differences expressed as d estimates and 95% CIs. Statistical heterogeneity was assessed using I² and Χ².

Sensitivity analysis was conducted by removing one trial at a time. Meta-regression was used for the moderator analysis.
Publication bias was assessed using Egger’s and Begg’s tests, and the trim-and-fill method.

**Results of the review**

Thirty-seven RCTs were included in the review (2,929 participants) with forty comparisons. The mean PEDro score was 7.0±1.0, which indicated relatively high methodological quality. There was no evidence of publication bias.

Due to evidence of statistical heterogeneity, random-effect results were presented. Exercise provided a small overall reduction in depressive symptoms compared with standard care among all types of cancer (d -0.13, 95% CI -0.26 to -0.01; 37 RCTs).

Subgroup analysis by cancer type revealed significant reductions in depressive symptoms among breast cancer participants (d -0.17, 95% CI -0.32 to -0.02; 24 RCTs), but no significant difference in depressive symptoms among prostate (two RCT), leukaemia (two RCTs), lymphoma (two RCTs), and colorectal cancer participants (one RCT).

Three moderators explained variance of the efficacy of exercise to reduce depressive symptoms. Weekly volume of aerobic exercise reduced depression in a dose-response fashion (p=0.03), a pattern that was only evident in higher quality trials. Exercise reduced depressive symptoms most when exercise sessions were supervised (p=0.01) and when cancer participants were aged from 47 to 62 years (p=0.01). These three moderators together explained 35% of the variance in depression reduction resulting from exercise.

Other moderator analyses were presented in the review.

**Authors’ conclusions**

Exercise training provided a small overall reduction in depressive symptoms among cancer participants. Depressive symptoms were reduced to the greatest degree among breast cancer participants, among cancer participants aged 47 to 62 years, or when exercise sessions were supervised.

**CRD commentary**

Inclusion criteria for the review were clearly defined. Several relevant data sources were searched; publication bias was not detected. Some attempts were made to reduce reviewer error and bias during data extraction and quality assessment, but it was not clear if the same methods were used for study selection.

Quality assessment indicated that the quality of the included trials was generally good. Trials were combined using standard statistical techniques. Statistical heterogeneity was assessed. Moderator analysis was also conducted, which was appropriate given the aims of the review. Most of evidence came from Caucasian women with breast cancer, which the authors acknowledged limited generalisability.

The review was generally well conducted and the authors’ conclusions and recommendations appear reliable.

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

**Practice:** The authors stated that cancer participants should try to avoid physical inactivity and should discuss with their health care provider the safety and feasibility of exercising to optimise the management of depressive symptoms. If possible, patients should eventually aim to achieve larger weekly volumes of aerobic exercise, complimented with resistance training twice-weekly, and flexibility training on days of non-exercise.

**Research:** The authors stated that further research was needed in other ethnic groups and other cancer types.

**Funding**

University of Connecticut Research Advisory Council Foundation grant.

**Bibliographic details**


**PubMedID**

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