The effect of exercise training on anxiety symptoms among patients

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CRD summary
This review concluded that exercise training reduced anxiety symptoms among patients with a chronic illness. Although the authors’ conclusions reflected the evidence presented, the uncertain quality of the included studies, potential for missed studies and limited study details mean that the authors’ conclusions should be interpreted with caution.

Authors' objectives
To assess the effect of exercise training on anxiety symptoms among patients with a chronic illness.

Searching
The Physical Activity Guidelines for Americans Scientific Database, Google Scholar, PubMed (including MEDLINE), PsycINFO, and Web of Science were searched for English-language studies (dates ranged from 1995 to December 2008); search terms were reported. Eligible articles were searched manually for additional studies.

Study selection
Randomised controlled trials that randomly assigned sedentary adults with a chronic illness to an exercise intervention of at least three weeks duration, or a comparison condition that lacked exercise, were eligible for inclusion if they reported an outcome that measured anxiety at both baseline and following exercise training. Studies were excluded if they: included exercise as part of a multicomponent intervention, but only included the additional component in the intervention group; compared exercise only with active treatment; focused on education promotion interventions to increase physical activity, but did not demonstrate an actual increase in activity levels; and used anxiety outcome measures for a specific phobia. In the included studies there were, on average, three exercise training sessions per week that lasted 42 minutes and were employed over 16 weeks duration. Included participants had a range of conditions, including cardiovascular disease, fibromyalgia, multiple sclerosis, psychological disorders, cancer, chronic obstructive pulmonary disease and chronic pain. The average exercise adherence rate was 78% with adherence reported for 68% of the effects. Mean patient age was 50 years and 59% were female.

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

Assessment of study quality
Two authors independently assessed the quality of included studies with the following criteria: randomisation methods; baseline differences between groups; quality of the anxiety outcome measure; adherence; and descriptions of exercise programmes.

Data extraction
Two authors independently calculated Hedges' g effect size and 95% confidence intervals (CIs); these were calculated by subtracting the mean change in the comparison condition from the mean change in the experimental condition and dividing the difference by the pooled standard deviation of the baseline scores. Information regarding potential moderator variables was also extracted. Where standard deviations were not reported, they were derived from the largest other study that assessed the same anxiety measure. Effect sizes were adjusted for small sample size bias and were calculated from exact P values where exact means or standard deviations were not available.

Methods of synthesis
Hedge's g effect size and 95% CI were pooled using a random-effects model. The influence of primary moderator variables (length of exercise program, session duration, change in physical fitness, type of intervention, type of comparison group and time frame of anxiety report) and secondary moderator variables (see paper) were also analysed. Statistical heterogeneity was not reported, but heterogeneity was explored through the moderator variables. Funnel plots (not shown) and fail-safe N was calculated to assess publication bias.
Results of the review
A total of 40 studies were included in the review (n not reported). Funnel plots suggested a lack of publication bias (not shown). Fail-safe N was 1,525.

Exercise training significantly reduced anxiety symptoms compared with no treatment by a mean effect of 0.29 (95% CI 0.23 to 0.36).

The largest anxiety improvements resulted from: exercise training programs that lasted between three and 12 weeks (mean effect 0.39, 95% CI 0.28 to 0.49); exercise session duration that exceeded 30 minutes (mean effect 0.36, 95% CI 0.27 to 0.44); and those with an anxiety report time frame greater than one week (mean effect 0.44, 95% CI 0.29 to 0.59).

Authors’ conclusions
Exercise training reduced anxiety symptoms among sedentary patients who had a chronic illness.

CRD commentary
The review question was clear and supported by potentially reproducible inclusion criteria, although the authors did not specify the specific outcome measures assessed; few study details were reported. The search strategy appeared to be thorough, but unpublished studies were not actively sought and the search was restricted to English-language publications, so publication and language biases may have been present and some studies may have been missed. However, publication bias was assessed and reported to be absent. Appropriate steps were taken to minimise the risk of reviewer error and bias for data extraction and validity assessment; it was unclear whether this extended to study selection. Study quality was assessed with appropriate criteria, although the authors did not report an overall score or comment upon study quality. Standard statistical methods were used to pool the data. No assessment of statistical heterogeneity was reported, but the impact of moderator variables on the regression model were explored and reported. Although the authors’ conclusions reflected the evidence presented, the uncertain quality of the included studies, potential for missed studies and limited study details mean that the authors’ conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that well-designed studies that assessed the effects of exercise training on anxiety in patients with illnesses such as anxiety disorders, chronic obstructive pulmonary disease, cancer, chronic pain, lupus, epilepsy and multiple sclerosis were required. Studies should provide clear and complete information regarding medication use and exercise stimulus. Further studies could: assess the impact of understudied types of exercise and different exercise training intensities and durations while controlling for energy expenditure; and investigate the characteristics of exercise stimulus to optimise program adherence and compliance with intensity and duration prescription. Studies should also include a valid measure of persistent anxiety in order to assess the chronic effects of exercise training on anxiety symptoms.

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