CRD summary
This review investigated whether exercise interventions are an effective treatment for depression. The authors concluded that exercise can be a powerful intervention for clinical depression. The reliability and generalisability of the conclusion was unclear as the quality of the evidence was not assessed and the statistical and clinical diversity of the studies were not considered.

Authors’ objectives
To examine the efficacy of exercise treatments for depression and other affective mental disorders.

Searching
PsycINFO, MEDLINE and the Cochrane CENTRAL Register were searched up to 2005 for English language studies published in peer-reviewed journals; the search terms were provided. The references of review articles were also checked.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies of exercise interventions compared with a nonactive comparator, such as waiting-list or placebo treatment, low-level exercise or health education, were eligible for inclusion. The included studies were of exercise alone (such as walking, running, jogging and progressive resistance training) or exercise as an adjunctive treatment to drug therapy. The included studies of exercise alone varied in exercise frequency from two to four times per week and in duration from 20 to 45 minutes (where this was reported). The most common comparator was no treatment or waiting-list; other studies used low-level exercise or health education. Studies that did not meet the inclusion criteria for the meta-analysis were included in a separate narrative synthesis but are not considered in this abstract.

Participants included in the review
Studies of people with affective disorders were eligible for inclusion provided the symptoms were not secondary to another clinical disorder (e.g. drug abuse). One study was excluded because the symptoms of depression were not considered severe enough (Beck Depression Inventory score of less than 11). The included studies were of in-patients and out-patients, mainly with symptoms of depression. Three studies considered only older depressed patients and two studies only women with depression.

Outcomes assessed in the review
The outcome of interest was depression and only studies that reported baseline and follow-up scores were included. The included studies used the Beck Depression Inventory, Hamilton Rating Scale for Depression, Edinburgh Postnatal Depression Scale, Self-Rating Depression Scale and Symptom Checklist Revised.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Hedge's g was used to calculate the effect size and 95% confidence interval (CI) for each study and a correction was made for small sample size. Where the standard deviation was not reported, g was estimated using the t or F statistic where available.

Methods of synthesis
How were the studies combined?
The studies were pooled in a meta-analysis using random-effects and fixed-effect models. The conclusions were based on the random-effects model. Excluded studies were discussed in a separate narrative synthesis (not reported in this abstract). Publication bias was investigated by calculating how many studies with an effect size of zero (i.e. finding no difference between the exercise intervention and control) would need to be published to reduce the effect size to one of no difference between the two groups.

How were differences between studies investigated?
Some differences between the studies were evident from the table of study characteristics. The correlation between effect size and publication year and sample size was investigated.

Results of the review
Eleven RCTs (n=513) were included.

Depression scores were lower with an exercise intervention compared with control (effect size 1.39, 95% CI: 0.89, 1.88). More recently published studies were associated with a larger effect size. The authors concluded that, in terms of risk of publication bias, the overall effect size was robust as 367 current or future studies with an effect size of zero would be required to change the findings to one of no difference between the exercise and control groups.

Authors' conclusions
The meta-analysis of studies of individuals with depression yielded a very large effect size, showing that exercise can be a powerful intervention for clinical depression.

CRD commentary
The authors stated a reasonably clear review question although the severity of depression that was considered relevant was unclear. Some relevant sources were searched, but some studies might have been missed due to the exclusion of unpublished and non-English language studies. However, the authors did explore the potential impact of publication bias and assessed the risk as low. It is unclear what methods, if any, were used to reduce error and bias in the review processes and the quality of the included studies was not assessed. Statistical heterogeneity was not assessed, therefore it is unclear whether it was appropriate to pool the studies in a quantitative synthesis. The included studies appeared diverse in terms of the intervention, comparator and participants and the effect size varied considerably between studies; the overall effect size may therefore have limited generalisability and may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that clinicians should consider adding exercise interventions to their treatment strategies for patients with depression.

Research: The authors did not state any implications for further research.

Bibliographic details

Indexing Status
Subject indexing assigned by CRD

MeSH
Anorexia Nervosa /psychology; Anxiety /therapy; Behavior Therapy /methods; Body Image; Bulimia /psychology; Depression /prevention & control; Exercise /physiology /psychology; Exercise Therapy; Feeding Behavior; Health Behavior; Mental Health; Motivation; Self Concept

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.