Do exercise and self-management interventions benefit patients with osteoarthritis of the knee? A meta-analytic review

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CRD summary
This review examined the effectiveness of patient education and exercise regimens on the well-being of patients with knee osteoarthritis; it concluded that both regimens had a modest, yet clinically important influence on patients' well-being. The review had serious flaws in its conduct and analysis, meaning that the authors' conclusions are not likely to be reliable.

Authors' objectives
To examine the effectiveness of patient education and exercise regimens on the well-being of patients with knee osteoarthritis.

Searching
MEDLINE and PsycINFO were searched for peer-reviewed articles published in English from 1966 to May 2005. Search terms were reported. Bibliographies of relevant articles and reviews were also searched.

Study selection
Randomised or quasi-randomised controlled trials of exercise (any form of physical activity or training) or self-management interventions for patients with knee osteoarthritis, were eligible for inclusion. Studies could not use medication as treatment for knee osteoarthritis, and had to report pre- and post-intervention quantitative assessments of physical and/or psychological health. Psychological, physical (including pain), and physiological (e.g. walking/balance tests) were the outcome categories of interest.

The mean age of participants was 65.8 years. Most studies either compared exercise to self-management and/or control, or compared different types of self-management. Exercise programmes varied in the type and intensity of workouts, and self-management programmes also varied greatly. Control groups received no treatment, standard care, attention control, or sham electric stimulation. Duration of intervention ranged from a single session to multiple sessions over two years (most lasted around 10 weeks, with weekly one to two hour sessions). A variety of self-report scales were used to assess outcomes.

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 study validity, although they did report study attrition rates.

Data extraction
Means and standard deviations were extracted in order to calculate Cohen's d for within-group comparisons (i.e. pre- and post-intervention scores). Authors were contacted for missing data where necessary. The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
Meta-analyses of pooled pre-/post-treatment effect sizes (for the different treatment types) were performed using a fixed-effect model. Treatment arms which combined exercise or self-management with another form of treatment were excluded from the meta-analysis. Sensitivity analyses were performed to examine the effect of quasi-randomisation. Publication bias was investigated using funnel plots.

Results of the review
Sixteen studies (n=2,154 participants) were included in the review (14 were RCTs, and two were quasi-RCTs), with sample sizes ranging from 20 to 786 participants. Attrition rates ranged from 0 to 43% (mean=14%).
Exercise programmes: Mean effect size was 0.29 (95% CI 0.23 to 0.36; 12 interventions) for physical outcomes reflecting a small improvement (no significant heterogeneity was found). For direct measures of impairment the mean effect size was 0.15 (95% CI 0.08 to 0.23; 11 interventions) also reflecting a small improvement, although significant heterogeneity (p<0.02) was found. There was no evidence of effect on psychological outcomes (four interventions).

Self-management programmes: There was no evidence of effect on physical outcomes (12 interventions) or on direct measures of impairment (3 interventions). Mean effect size for psychological dimensions was 0.20 (95% CI 0.08 to 0.33; nine interventions) without significant heterogeneity.

Control groups: No evidence of effect was found for all outcomes.

Funnel plots indicated little evidence of publication bias. Further results (including sensitivity analyses) were reported.

Cost information
One study found that exercise was more effective and less costly to implement than education. Another study found that education was more cost-effective than an attention control.

Authors' conclusions
Overall, both patient education and exercise regimens had a modest, yet clinically important influence on patients' well-being.

CRD commentary
The review addressed a clear question and was supported by appropriate inclusion criteria. Only two databases were searched for studies published in English, so relevant studies may have been missed and the review may have been subject to language bias and publication bias; funnel plots indicated that publication bias was not an issue. No methods for reducing the risk of reviewer error and bias (e.g. using two reviewers to independently select studies, and extract data) were reported as being used. No assessment of study quality was made, making it difficult to assess the reliability of the trial evidence (although the generally high attrition rates suggested that study quality may not have been good). The methods of meta-analysis used appeared unusual and somewhat over-complicated. The authors pooled effect sizes derived from the pre- and post-treatment scores for each type of treatment, rather than pooling effect sizes derived from comparing the randomised intervention and control group scores within a study. In doing this the analyses did not utilise the benefits of randomisation, so the results should be interpreted with much caution. Overall, this review had several rather serious flaws, meaning that the authors' conclusions are not likely to be reliable.

Implications of the review for practice and research
Practice: The authors suggested that programmes for patients with knee osteoarthritis need to include an exercise component to be effective in improving physical health.

Research: The authors stated that programmes are needed that can improve both the psychological and physical well-being of patients, and that different interventions and novel combinations of treatments need to be tested. Seven further recommendations were reported.

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