Exercise and health-related quality of life in older community-dwelling adults: a meta-analysis of randomized controlled trials
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CRD summary
In older community-dwelling adults, physical activity appeared to improve self-reported physical function, a component of health-related quality of life, but this needed confirmation in further trials. Given the poor quality of the trials and the lack of data for some analyses, the authors' conclusions may not be reliable and their recommendation for further well-designed trials appears to be warranted.

Authors' objectives
To determine the effects of physical activity on health-related quality of life (HRQoL) in older community-dwelling adults.

Searching
PubMed, EMBASE, the Cochrane Central Register of Controlled Trials (CENTRAL), and DAI were searched for studies published in English between January 1973 and August 2007; search terms were reported. The reference lists of retrieved studies and a database from the producers of the Short Form (SF-36) questionnaire, were also searched for further studies. Both published and unpublished studies were eligible for inclusion.

Study selection
Randomised controlled trials (RCTs) were eligible for inclusion if they compared a community-accessible physical activity (aerobic, strength training, or both) intervention alone with a non-intervention control, on at least one of the eight components and two summary measures of the 36-Item SF-36 health survey, in community-dwelling adults aged 45 years or older. Eligible interventions lasted longer than four weeks.

Approximately equal numbers of included trials assessed aerobic training, strength training, or both. The most common training modalities were walking and stationary cycling. The length of training sessions ranged from eight to 26 weeks, and the weekly frequency of sessions ranged from two to seven. The majority of interventions were supervised and compliance with the intervention ranged from 56% to 100%. All included participants were aged 50 years or older. The majority of the trials had populations of both genders and mainly White; four trials included minority populations that were Hispanic, Black, or Latino. None of the trials were limited to participants who were obese or overweight. The majority of the trials were conducted in the USA, with single trials conducted in Brazil, Denmark, The Netherlands, and Taiwan. Two trials were only available as unpublished dissertations.

Two reviewers assessed the eligibility of trials for inclusion and disagreements were resolved by adjudication.

Assessment of study quality
Two reviewers assessed the quality of the RCTs, using the Jadad scale, which assesses randomisation, blinding, and loss to follow-up. Each trial was awarded a score between zero and five.

Data extraction
Two reviewers extracted the change in HRQoL score between the intervention and control groups; disagreements were resolved through consensus. For each HRQoL component a standardised effect size (Hedges' g) was calculated (with variance) by dividing the change in HRQoL score by the pooled standard deviation (SD), which was calculated using the 95% confidence interval (CI) where reported. Where change score differences and SDs were not reported, they were calculated from pre- and post-intervention means and SDs for the intervention and control groups.

Methods of synthesis
A random-effects model was used to calculate pooled HRQoL effect sizes (Hedges' g) with 95% CIs. Effect sizes were judged to be small (0.20), medium (0.50), or large (0.80). Where the 95% CI for the effect size did not include zero, a
common language effect size was calculated and converted into an odds ratio (OR). Statistical heterogeneity was assessed using the Q and I² statistics; values of p greater than 0.10 and I² less than 50% were judged to be not significant.

Further analyses were carried out according to country of analysis (USA or other), type of analysis (intention-to-treat or per protocol), type of publication (published or dissertation), gender, type of intervention (aerobic, strength training, or both), and supervision of intervention (supervised or unsupervised). The effect of removing each study independently was also assessed, along with changes in effect over time. A meta-regression analysis was conducted to investigate the effects of trial quality, baseline HRQoL, age, intervention duration, duration of training sessions, intensity of intervention, and compliance with the intervention.

**Results of the review**

Eleven parallel RCTs (n=617 participants) were included in the review. Median trial quality score was two (range one to five). Only 54.5% of trials described the methods of randomisation; blinding was used in 36.4% of trials; and loss to follow-up was only clearly reported in 63.6% of the trials. Seven trials used a per protocol analysis, three used an intention-to-treat analysis, three used an intention-to-treat analysis, the remaining trial had no loss to follow-up.

A significant small to moderate improvement in standardised effect size was reported for physical function in the physical activity group (Hedges' g 0.41, 95% CI 0.19 to 0.64; overall OR 2.14, 95% CI 1.42 to 3.24). No significant statistical heterogeneity was found. No statistically significant differences were reported for any of the other nine HRQoL outcomes. No statistically significant effects were reported for any of the subgroups analysed.

Meta-regression showed that improvements in mental health were associated with lower baseline HRQoL values (p=0.02); smaller improvements were associated with older people (p=0.02) and bodily pain (p=0.005). Lower intensity aerobics sessions were also associated with greater improvements in bodily pain (p=0.004). No other significant associations were reported for the remaining variables.

**Authors' conclusions**

In older community-dwelling adults, physical activity appeared to improve self-reported physical function, a component of HRQoL, but this needs confirmation in further trials.

**CRD commentary**

This review answered a clear research question using clearly defined criteria. Both published and unpublished data were sought and included, which limits the risk of publication bias. There may have been some risk of language bias as only English-language trials were included. Precautions were taken at each stage of the review process to try to reduce the risk of reviewer error and bias. Trial quality was assessed using appropriate criteria and was generally found to be low. The analysis assessed statistical heterogeneity and trials were pooled using appropriate methods. The influence of type of intervention and other factors was examined, but some analyses were restricted by a lack of data.

Overall, given the poor quality of the trials and the lack of data for some analyses, the authors' conclusions may not be reliable and their recommendation for further well-designed trials appears to be warranted.

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

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further well-designed randomised controlled trials examining the effects of physical activity on physical function in older community-dwelling adults were required. Trials that investigate the dose effects of physical activity on other components of HRQoL were also needed.

**Funding**

Centers for Disease Control and Prevention; Association of American Medical Colleges (U36/CCU319276;
Bibliographic details

DOI
10.1177/0733464808327456

Original Paper URL
http://jag.sagepub.com/cgi/content/abstract/28/3/369

Indexing Status
Subject indexing assigned by CRD

MeSH
Aged; Aged, 80 and over; Exercise; Housing for the Elderly; Quality of Life

AccessionNumber
12009105731

Date bibliographic record published
26/08/2009

Date abstract record published
20/01/2010

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.