Meta-analysis: chronic disease self-management programs for older adults

CRD summary
This review examined the efficacy and important components of chronic disease self-management programmes. The authors concluded that these programmes probably produce clinically important benefits for elderly people with diabetes mellitus or hypertension, but not for those with osteoarthritis. Despite some evidence of between-study differences and publication bias, the authors’ conclusions are likely to be reliable.

Authors’ objectives
To determine the efficacy and important components of chronic disease self-management programmes for older adults with hypertension, osteoarthritis and diabetes mellitus.

Searching
For studies published between 1980 and 1995, the authors searched An Indexed Bibliography on Self-Management for People with Chronic Disease. Further studies (including those published after 1995) were obtained through searches of MEDLINE, PsycINFO, CINAHL, the Cochrane Library, the Assessment of Self-Care Manuals, and other relevant reviews. The search was updated in September 2004. In addition, the Health Care Quality Improvement Projects database, maintained by the U.S. Centers for Medicare and Medicaid Services, was searched.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion. To be included, the studies had to have a follow-up duration of 3 to 12 months for diabetes, 4 to 6 months for osteoarthritis, and 2 to 6 months for hypertension.

Specific interventions included in the review
Studies that compared systematic chronic disease self-management interventions, which helped patients actively participate in self-monitoring and/or decision-making, with either usual care or a control group were eligible for inclusion. The content and delivery of such interventions varied across the included studies; further details were reported.

Participants included in the review
Studies of adults with chronic hypertension, osteoarthritis or diabetes mellitus were eligible for inclusion in the review.

Outcomes assessed in the review
Studies were eligible for inclusion if they reported clinical outcomes, such as pain and function for osteoarthritis; measures with strong links to clinical outcomes, such as haemoglobin A1c levels, fasting blood glucose levels and weight for diabetes, and blood-pressure for hypertension; and intermediate outcomes, such as knowledge, self-efficacy and health behaviours thought to be related to clinical outcomes.

How were decisions on the relevance of primary studies made?
Two independent reviewers selected the articles. Any disagreements were resolved by consensus, or by the decision of a third reviewer.

Assessment of study quality
Each included study was assessed for components of quality based on the Jadad scale, which assesses the reporting of randomisation, adequacy of randomisation, description of blinding, adequacy of blinding, and withdrawals and drop-outs. Two independent reviewers assessed study quality. Any disagreements were resolved by consensus, or by the decision of a third reviewer.
Data extraction
Two independent reviewers extracted the data from each included study. Any disagreements were resolved by consensus, or by the decision of a third reviewer. For each comparison between an intervention group and usual care or control group, data were extracted to calculate an unbiased estimate of Hedges's $g$ effect size (ES) and its standard deviation (SD). Studies for which a follow-up mean could not be calculated were excluded from the analysis. Missing standard deviations were imputed.

Methods of synthesis
How were the studies combined?
The ESs of individual studies were weighted by the inverse of the variance and pooled using a random-effects model, and the associated 95% confidence intervals (CIs) estimated, for each condition and outcome. Publication bias was assessed using a funnel plot, an adjusted rank test and a regression asymmetry test.

How were differences between studies investigated?
Study arms were stratified according to whether the intervention did or did not include each one of the following characteristics: tailoring, group setting, feedback, psychological emphasis and medical care, and use of meta-regression to examine the impact of these on effect size. Sensitivity analyses were used to account for studies which had multiple treatment arms. Further sensitivity analyses compared diabetes diet and education studies with all other diabetes studies, and hypertension relaxation response and anxiety management studies with all other hypertension studies. Statistical heterogeneity was assessed using a chi-squared test.

Results of the review
Fifty-three RCTs ($n=8,455$) were included in the review.

Diabetes.
Self-management programmes showed an approximate 0.81% reduction in haemoglobin A1c levels compared with control; the ES was $-0.36$, (95% CI: $-0.52$, $-0.21$) based on 20 studies. Fasting blood outcomes were also improved; the ES was $-0.28$, (95% CI: $-0.47$, $-0.08$) based on 13 studies, equivalent to a reduction in blood glucose level of 0.95 mmol/L (17 mg/dL). There was no statistically significant difference in weight change between the treatment and control groups (14 studies; ES $-0.04$, 95% CI: $-0.16$, 0.07). The 3 studies that focused primarily on diet and education had a pooled ES for haemoglobin A1c that was almost twice as great as the pooled ES for the remaining 9 studies; however, this difference was not significant. The funnel plot and statistical tests revealed statistically significant unaccounted for heterogeneity, which might have been a result of publication bias.

Osteoarthritis.
Self-management programmes were associated with statistically significant improvements in pain (14 studies; $-0.06$, 95% CI: $-0.10$, $-0.02$) and function (12 studies; ES $-0.06$, 95% CI: $-0.10$, $-0.02$). These improvements were, respectively, only equivalent to less than 2 mm on a 100-mm visual analogue pain scale and about 2 points on the Western Ontario and McMaster Universities osteoarthritis Index. There was no evidence of publication bias.

Hypertension.
Based on 13 studies, self-management programmes were associated with a statistically significant decrease of 5 mmHg in systolic blood-pressure (ES $-0.39$, 95% CI: $-0.51$, $-0.28$) and 4.3 mmHg in diastolic blood-pressure (ES $-0.51$, 95% CI: $-0.73$, $-0.30$). The ES for the 7 studies that focused primarily on relaxation response or anxiety management was not significantly different from that of the remaining 6 studies. The regression asymmetry test showed unaccounted for heterogeneity, which might have been a result of publication bias.

Across-condition analyses revealed no significant differences in ES between studies that did or did not use the five intervention characteristics: tailoring, group setting, feedback, psychological emphasis or medical care.
Authors' conclusions
Chronic disease self-management programmes for elderly people with diabetes mellitus or hypertension probably produce clinically important benefits. The current data were insufficient to identify the elements of the programme responsible for these benefits. Osteoarthritis self-management programmes did not appear to have clinical benefits in terms of pain or function.

CRD commentary
The authors set out a clear objective and the inclusion criteria were broad but clearly defined. Several relevant sources were searched, although it was unclear whether language restrictions were applied to the search, or whether unpublished data were included. Two independent reviewers carried out the study selection, validity assessment and data extraction process, which helps to minimise reviewer error and bias. Study quality was assessed, although there was no discussion of the impact of methodological quality on the results.

Adequate study details were presented, and these highlighted considerable variation across the included studies. Given the different interventions used across studies, and the statistical heterogeneity detected in the diabetes and hypertension analyses, combining the studies statistically might not have been appropriate. However, sensitivity analyses were used to investigate differences between the types of intervention. The authors acknowledged that the positive results of this review may be tempered by findings of unaccounted for heterogeneity and possible publication bias. However, despite some limitations, this was generally a well-conducted review and the authors' conclusions are likely to be reliable, although given the broad inclusion criteria it was not clear to whom the results are applicable.

Implications of the review for practice and research
Practice: The authors stated that self-management programmes for diabetes mellitus and hypertension probably produce clinically important benefits, but the lack of evidence about which components of self-management programmes are important limits the ability to design programmes that will be most clinically and cost-effective. Self-management programmes for people with osteoarthritis do not appear to have clinically beneficial effects on pain or function.

Research: The authors stated that the possibility that self-management programmes achieve some of their benefits by increasing medication adherence should be considered.

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Other publications of related interest
This additional published commentary may also be of interest. Self-management education for osteoarthritis [comments and responses]. Ann Intern Med 2006;144:617-8.

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