Effect of exercise referral schemes in primary care on physical activity and improving health outcomes: systematic review and meta-analysis

CRD summary
The authors concluded that considerable uncertainty remained about the effectiveness of exercise referral schemes for increasing physical activity and health outcomes. Given the limitations of the small number of included studies (such as study variation and potential for bias) the authors' cautious conclusions seem appropriate. Potential for missed studies should be taken into account when interpreting the conclusions.

Authors' objectives
To assess the effect of exercise referral schemes in the primary care setting on physical activity and health outcomes.

Searching
MEDLINE, MEDLINE In-Process, EMBASE, PsycINFO, Web of Science, SPORTDiscus, Science Citation Index Expanded and Social Sciences Citation Index were searched to July 2011 for articles in English published from 1990 onwards. This updated a HTA report (see Other Publications of Related Interest) searched to 2009. The Cochrane Library (2009) was searched. Ongoing trial registers and references from relevant studies were searched. Search strategies were available online.

Study selection
This article updated a HTA report that assessed other related aspects of exercise referral schemes not discussed here but discussed in other publications (see Other Publications of Related Interest).

Randomised controlled trials (RCTs) and non-RCTs (cluster or individual) that compared the effect of exercise referral schemes versus a control (usual care, no intervention or alternative exercise referral schemes) on sedentary individuals with or without medical conditions in a primary care setting were eligible for inclusion. Exercise referral schemes were required to comprise three components: referral by a primary care healthcare professional to a third party service provider; physical activity or exercise programme tailored to individual needs (more intensive than simple advice) and inclusion of at least one form or a combination of counselling; and initial assessment and monitoring throughout the programme. Eligible trials were required to report the outcomes physical activity, physical fitness, clinical outcomes, health-related quality of life and adverse events. Abstracts were excluded.

Most included trials were conducted in the UK; one trial was conducted in each of Denmark and Spain. Where reported, participants were obese or had hypertension, raised cholesterol, diabetes, metabolic syndrome, cardiovascular disease or a mental health condition. Most participants were female. Reported mean age of participants ranged from 54 to 71 years. Exercise referral scheme interventions were mostly provided by leisure centres for between 10 weeks and six months. Exercise sessions were of moderate or individually tailored intensity and usually took place twice a week and lasted between 30 and 60 minutes per session. Most interventions were given in a group setting; some were delivered individually. Interventions could include an initial consultation and/or an exit intervention. None of the included trials used an objective measure of physical activity.

At least two reviewers screened studies for inclusion. Disagreements were resolved by consensus.

Assessment of study quality
Trial quality was assessed using previously published criteria that included method of randomisation, allocation concealment, outcome assessor blinding, similarity of groups at baseline, intention-to-treat analysis (ITT), handling of missing data and withdrawals. Each trial was graded on overall risk of bias.

The authors did not state how many reviewers performed the quality assessment.

Data extraction
One reviewer extracted dichotomous outcome data to calculate relative risks (RRs) and extracted continuous outcome data to calculate mean differences, each with 95% confidence intervals (CIs). Primary authors were contacted for further details where necessary. A second reviewer checked data extraction for accuracy. Discrepancies were resolved through discussion or referral to a third reviewer.

Methods of synthesis
Where data permitted, a fixed-effect model (or random-effects model where statistical heterogeneity was evident) was used to combine relative risks and 95% CIs. Mean differences and their 95% CIs were combined to calculate standardised or weighted mean differences. Study heterogeneity was assessed through visual inspection of study details. Statistical heterogeneity was assessing using the $I^2$ statistic and $X^2$ test. Where studies were too heterogeneous, a narrative synthesis was undertaken. Findings were reported based on type of comparator: usual care; alternative exercise or physical activity intervention; and exercise referral scheme plus behaviour change intervention (or alternative exercise referral scheme). Where primary authors did not account for missing data at follow-up, the reviewers adjusted the analyses to include all randomised participants.

Publication bias was not formally assessed due to the small number of studies included in the review.

Results of the review
Eight RCTs (13 publications) that included 5,190 participants (range 52 to 2,160) were included in the review. Three trials were at moderate risk of bias and five were at low risk of bias. Follow-up ranged from two to 12 months.

Physical activity: The most consistently reported outcome was the proportion of participants who achieved 90 to 150 minutes of activity of at least moderate intensity per week.

Participants who received exercise referral interventions reported an increase in physical activity compared with usual care at six to 12 months follow-up (RR 1.16, 95% CI 1.03 to 1.30; four RCTs; $I^2$=0%). The difference was no longer significant when reviewers adjusted to include all randomised patients.

There were no statistically significant differences in physical activity between participants who received exercise referral interventions compared to alternative physical activity or alternative exercise referral scheme interventions (one RCT each).

Physical Fitness: There were no statistically significant differences between exercise referral interventions and any comparator on cardiorespiratory fitness (three RCTs). There was evidence of high statistical heterogeneity ($I^2$=81%) for the comparison with usual care (cycle ergometer).

Clinical Outcomes: There were no statistically significant differences between exercise referral interventions and any comparator for blood pressure, serum lipids, weight and obesity measures, respiratory function and diabetes control (five RCTs).

Psychological well-being: Two RCTs reported a significant reduction in depression (standardised mean difference -0.82, 95% CI -1.28 to -0.35; $I^2$=0%) but not anxiety for exercise referral schemes compared with usual care.

Authors' conclusions
Considerable uncertainty remains as to the effectiveness of exercise referral schemes for increasing physical activity, fitness or health indicators and whether they are an efficient use of resources for sedentary people with or without a medical diagnosis.

CRD commentary
The review question and supporting inclusion criteria were clearly defined. Several appropriate sources were searched for relevant studies. The search was limited to fully published articles in English, so there was a risk of language and publication biases. Screening of included trials and data extraction were performed in duplicate; it was unclear whether this was also true for quality assessment, so reviewer error and bias could not be ruled out. Appropriate criteria were used to assess the quality of the included trials, most of which were deemed to be at low risk of bias.

The authors highlighted that methodology was poorly reported in some trials, resulting in potential for selection and
assessment biases. Synthesis of the trials seemed appropriate, including both quantitative and qualitative syntheses dependent on heterogeneity across trials. The authors acknowledged that there was considerable heterogeneity.

Given the limitations of the small number of included studies, the authors' cautious conclusions seem appropriate. Potential for missed studies should be taken into account when interpreting the conclusions.

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

**Practice:** The authors stated that the impact of exercise referral schemes on participants with pre-existing medical conditions remained unclear.

**Research:** The authors stated that high-quality trials were needed to assess the impact of exercise referral scheme interventions on patients with medical conditions and investigate whether any short-term gains were maintained in the long term. The authors stated that future research should consider incorporating theory driven interventions to complement an exercise referral scheme and compare the outcomes and costs associated with alternative approaches to physical activity promotion in primary care.

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**Other publications of related interest**


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