Effectiveness of interventions to promote physical activity among socioeconomically disadvantaged women: a systematic review and meta-analysis

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CRD summary
The authors concluded that the evidence demonstrated the importance of group-based programmes to promote physical activity among socio-economically disadvantaged women and further research was warranted. This was a well-conducted review with a large evidence base. The authors acknowledged limitations of the evidence (such as substantial heterogeneity) and their cautious conclusions seem appropriate and likely to be reliable.

Authors’ objectives
To assess the effectiveness of interventions to promote physical activity among socio-economically disadvantaged women.

Searching
Six electronic databases – including PubMed, EMBASE and CINAHL – were searched up to March 2011 for published articles in English. Search terms were reported. Reference lists of studies and two physical activity journals were searched manually. Authors were contacted for unpublished data.

Study selection
Eligible studies were randomised controlled trials (RCTs) and non-RCTs that compared any intervention to increase physical activity in any setting versus any control groups (including no intervention/contact, attention control or wait-list control). Eligible trials were in community dwelling women experiencing socioeconomic disadvantage (as defined in the review) or trials where more than 80% of participants were women. Participants had to be aged 19 to 64 years (or the mean age in a study had to be less than 65 years) and have no pre-existing medical condition. Eligible trials had to report physical activity outcomes (or equivalent) at baseline and at least immediately post intervention. Studies were excluded if they were targeted at pregnant women, athletes or sports students.

Included studies were conducted between 1990 and 2010. Most studies were conducted in North America or Europe; others were in Australia, Iran and Colombia. Intervention duration ranged from six weeks to six years (median five months). Interventions were presented in various formats (such as written education materials, counselling and telephone support) and various settings (including home and community sites). Only a small proportion of interventions included exercise sessions. Physical activity measures were mostly self-reported. More than half of the studies used at least one theoretical framework; the most common were the transtheoretical model of behaviour change and social cognitive theory. Some control groups received no contact or were described as wait list controls. A high proportion of control groups received some elements of the study intervention.

Two reviewers independently screened studies for inclusion. Discrepancies were resolved through discussion and consensus or referral to a third reviewer.

Assessment of study quality
Two reviewers independently assessed study risk of bias using the six-item EPHPP (Effective Public Health Practice Project) Quality Assessment Tool for Quantitative Studies. Criteria included selection bias, study design, confounders, blinding, data collection methods and withdrawals and drop-outs.

Each criterion was rated as low, medium or high and each study was given a global rating: low (four high ratings and no low ratings), medium (fewer than four high ratings and one low rating) or high (two or more low ratings from the six criteria). Discrepancies were discussed until consensus was reached.

Data extraction
Physical activity outcomes were extracted as continuous data or proportions of participants meeting a specified level of physical activity (as defined in the studies). Standardised mean differences (SMD) and their 95% confidence intervals
(CI) were calculated or odds ratios and their 95% CI were converted to standardised mean differences (as described in the review).

Where possible, data were extracted on an intention-to-treat basis. Data were extracted based on certain preferences (fully reported in the review); for example objective data were preferred over subjective data.

Data were extracted by one reviewer and checked by a second reviewer. Discrepancies were resolved through consensus.

**Methods of synthesis**

A random-effects model was used to combine standardised mean differences and their 95% confidence intervals. Statistical heterogeneity was assessed using the Χ² test and I² statistic (I²>50% indicated substantial heterogeneity). Statistical heterogeneity was explored using subgroup analyses based on intervention methods, settings and durations, use of a theoretical framework, mean age of participants and risk of bias. Studies with low or moderate risk of bias were combined for analyses.

Sensitivity analyses were performed by excluding studies with high risk of bias, studies using self-report measures or not adjusting for clustering, and studies reporting dichotomous outcome data. Univariate meta-regression was performed to explore the influence of physical activity intensity on outcomes.

**Results of the review**

Nineteen studies (6,339 participants, range 43 to 1,578) were included in the review. Two studies were at low risk of bias, three were at moderate risk of bias and 14 high risk of bias.

Overall results indicated a significant increase in physical activity in women who received the intervention (SMD 0.16, 95% CI 0.04 to 0.29; 19 studies) but there was significant statistical heterogeneity (I²=66%). Subgroup analyses indicated that intervention delivery mode explained some of the heterogeneity: group delivery (SMD 0.36, 95% CI 0.17 to 0.54; 11 studies; I²=59%), individual delivery (SMD -0.02, 95% CI -0.35 to 0.31; five studies; I²=63%) and community delivery (SMD -0.02, 95% CI -0.10 to 0.05; three studies; I²=0%).

Sensitivity analyses did not significantly alter the results. A funnel plot showed some evidence of publication bias.

**Authors' conclusions**

The evidence clearly demonstrated the importance of group-based programmes to promote physical activity among women experiencing socioeconomic disadvantage. Further research will provide important insights for policy and practice.

**CRD commentary**

The review question and inclusion criteria were clearly stated. A comprehensive literature search was undertaken but there was potential for missed data (acknowledged by the authors). Each stage of the review process was done in duplicate, which minimised potential for reviewer error and bias. Study quality was assessed using appropriate criteria; there was evidence of high risk of bias (acknowledged by the authors).

Study and participant characteristics were fully reported in the review. The authors acknowledged limitations of the evidence, including use of self-reported measures, significant heterogeneity and calculation of standardised mean differences from dichotomous data. The authors thoroughly explored heterogeneity using appropriate statistical methods.

This was a well-conducted review that included a large evidence base. The authors acknowledged the limitations of the evidence and their cautious conclusions seem appropriate and likely to be reliable.

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

**Practice:** The authors stated that the results made an important contribution to informing the design of public health interventions for this high-risk population group and provide fundamental guidance for policy-makers and service providers.
Research: The authors stated that further research was needed to explore the impact of different factors (such as type of social support and type of facilitator) on the effectiveness of interventions. They also stated a need for research on interventions that incorporated time management strategies and assessed cost-effectiveness and adverse outcomes.

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