Website-delivered physical activity interventions: a review of the literature
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CRD summary
The review concluded that there was some evidence suggesting that physical activity levels in adults were improved through website-delivered interventions. The effects were short term with limited evidence of maintenance in levels. The authors' conclusions appear appropriate based on the evidence presented, but there was a lack of validity assessment and potential for selection and language bias.

Authors' objectives
To evaluate the efficacy of website-delivered physical activity interventions aimed at adults.

Searching
PubMed, MEDLINE, PsycINFO and Web of Science were searched to July 2006 for English-language articles. Search terms were reported. Reference lists of relevant publications were scanned and experts in the field were contacted for additional articles.

Study selection
Randomised controlled trials (RCTs) and quasi-experimental studies (pre-test, post-test comparison group design) of website-delivered physical activity interventions using the Internet or email were eligible for inclusion. Studies that also targeted other behaviours, such as dietary habits, or included additional intervention components (face-to-face or telephone sessions) were eligible for inclusion. The primary outcome of interest was change in physical activity. Secondary outcome measures related to physical activity such as change in body weight or stage of change of physical activity were also of interest.

Most included studies evaluated a website-delivered intervention in comparison to another intervention such as print materials, face-to-face counselling, standard or low-intensity website-delivered or a no-intervention control group. Most included interventions were aimed at increasing total physical activity; some directly targeted walking, moderate or vigorous physical activity, or meeting physical activity guidelines. Some studies targeted dietary behaviours. Health behaviour theories used in the included studies were Social Cognitive Theory, the Transtheoretical Model and the Theory of Planned Behaviour. Various validated instruments were used to assess outcomes (details reported in review). The proportion of women in the included studies was 66 per cent. The age of participants ranged from 18 to 60 years. The proportion of participants with a college or university education was 84 per cent. A large number of studies recruited participants through media advertisements in newspapers, radio and TV and email contact.

Reviewers independently selected studies for inclusion. Disagreements were resolved through discussion. The authors did not state how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they formally assessed validity. But, data on method of randomisation, blinding of assessors, rates of attrition, use of power calculations and intention-to-treat (ITT) analyses were reported in the results.

Data extraction
Data from individual studies of specific intervention characteristics relating to internet use were extracted. Outcomes were evaluated separately at each follow-up point: short term (three months or less); medium term (four to six months); and long term (more than six months). Studies were classified at each follow-up point as having a positive outcome if significant differences between groups were reported. Studies comparing different intervention delivery modes were classified as positive if there were no significant differences between groups, but there was a significant increase in physical activity in all groups. Effect sizes were calculated using Cohen's formula where there were sufficient data available, but were only reported when significant differences were found between intervention groups. Effect sizes were classified as small (<0.5), medium (0.5 to 0.8) or large (>0.8).
Reviewers independently extracted data. Disagreements were resolved through discussion. The authors did not state how many reviewers performed the data extraction.

**Methods of synthesis**
The studies were combined in a narrative synthesis. Each study was described in the text and additional descriptive information was presented in tables.

**Results of the review**
Fifteen studies (n=4,845) were included in the review: 14 RCTs and one cluster non randomised controlled trial. Computer sampling to randomise participants was reported in four studies. One study reported blinding of researchers. Ten studies reported participation rates. All studies reported attrition rates. Six studies used intention-to-treat analysis to account for high attrition. Six studies reported using power calculations. Sample sizes ranged from 13 to 2,121; seven studies had less than 100 participants.

Eight RCTs found improvements in physical activity associated with website delivered interventions. Effect sizes were calculable for five of these, with a mean effect size of 0.44 (range 0.13 to 0.67).

A greater proportion of studies reporting five or more communications with participants over the Internet reported improvement in physical activity (78 per cent) compared to those with fewer contacts (17 per cent).

Improvement in physical activity was found to be greater for studies reporting short-term follow up compared with other follow-up periods (60 per cent at three months or less, 50 per cent at three to six months and 40 per cent at more than six months).

There were no clear associations of increases in physical activity with intervention duration, theory-based interventions, initial face-to-face contact, targeting of dietary behaviours, interaction method and behaviour modification.

**Authors' conclusions**
The results found some evidence suggesting that website-delivered physical activity interventions produced increased levels of physical activity. The effects of the interventions were short-term. There was limited evidence of continued changes in physical activity.

**CRD commentary**
Inclusion criteria were defined in terms of intervention, outcomes and study design, and broadly defined in terms of participants. Several relevant sources were searched. By limiting included studies to those in English, the authors may have missed some relevant studies. Some attempts were made to locate unpublished studies. Methods were used to minimize bias in the selection of studies and extraction of data. Validity was not formally assessed, but methodological limitations of the studies were discussed in the text. In view of the differences between studies, a narrative synthesis was appropriate. Participants were recruited largely through media adverts in newspapers and on radio and TV, so the results may have limited generalisability. The authors' conclusions appear appropriate based on the evidence presented, but it should be borne in mind there was a lack of validity assessment and potential for selection and language bias.

**Implications of the review for practice and research**
**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further research was needed to make direct comparisons of intervention elements using objective measurements of website usage and measuring physical activity at least six months post intervention to better understand internet-related communication technology for delivery of physical activity interventions. Future studies should include larger sample sizes, report attrition rates and data with and without intention to treat analysis, and include more representative populations (such as including more men and participants with lower levels of educational attainment).
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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.