Internet-based physical activity interventions: a systematic review of the literature
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CRD summary
This review concluded that interventions delivered via the Internet appeared to be more effective than no treatment (waiting list) for increasing physical activity in overweight adults. This conclusion was consistent with the evidence presented, but appears overstated given the lack of good-quality studies available.

Authors' objectives
To assess the methodological quality and effectiveness of interventions designed to promote physical activity by means of the Internet.

Searching
The authors searched PubMed, Web of Science, EMBASE, PsycINFO and The Cochrane Library from inception to July 2006. Search terms were reported. Reference lists of included articles and relevant reviews were searched to identify additional studies. The review was restricted to articles published in English, Dutch or German.

Study selection
Randomised controlled trials (RCTs) that evaluated interventions delivered predominantly via the Internet (websites or e-mails) and designed to promote physical activity in adults were eligible for the review. Studies had to report at least one measure of change in level or amount of physical activity and needed to include pre-test and post-test outcome data for control and intervention groups. The included studies compared an Internet-based intervention with a waiting list control group or compared Internet-based interventions that differed in amount of contact with therapists or in the details of the intervention. The duration of the interventions varied from 1 to 12 months. Participants were mainly overweight, but otherwise varied in age and health status; the percentage of men ranged from 0 to 49%.

Two reviewers independently selected studies for the review and any discrepancies were settled by consensus.

Assessment of study quality
Validity was assessed using a modified version of the criteria recommended by van Tulder et al; studies were given a quality score ranging from 0 to 13 depending on the number of criteria met. A score of 9 or more was taken as implying good methodological quality. In addition, quality of the intervention was assessed using six criteria classified as either intervention-related (tailoring of programme to participant characteristics, use of interactive self-monitoring and feedback and adherence to planned procedures or theoretical models) or process-related and outcome-related (use of a combination of physical activity measures, objective methods of data collection and additional fitness-related outcomes).

The authors did not state how the validity assessment was performed.

Data extraction
Pre-test and post-test (directly after finishing the intervention) activity outcome data were extracted. Data were extracted by two independent reviewers who were blinded to authorship, journal and other study-related information. Discrepancies were resolved by consensus.

Methods of synthesis
Studies were synthesised narratively by type of comparison (Internet-based intervention versus waiting-list control, comparison of interventions differing in access to therapists and comparison of interventions with different treatment procedures). Differences between studies were presented in tables and discussed in the text.

Results of the review
Ten RCTs (n=3,982 randomised participants) were included. Five trials met nine or more of the 13 quality criteria. With respect to intervention quality, most studies tailored the intervention to participant characteristics and used interactive self-monitoring and feedback tools. Six of the programmes were based on theoretical models.

Of three studies that compared an intervention with a waiting list control, two reported significant differences in increase in physical activity (favouring the intervention group); the effect sizes were small, which indicated that the differences were of questionable clinical relevance. None of these studies scored highly for methodological quality. One out of four studies that compared interventions with different levels of therapist contact reported a significant difference between groups. None of the three studies that compared interventions involving different procedures found a significant difference.

**Authors' conclusions**
There was indicative evidence that Internet-based interventions were more effective than a waiting list strategy for increasing physical activity in overweight adults.

**CRD commentary**
The inclusion criteria for interventions, study designs and outcomes were clear. Inclusion criteria for participants were broad, but this seemed unlikely to have affected the reliability of the review. The authors searched a range of relevant sources. Some language restrictions were imposed and unpublished studies were not sought, so there was a potential risk of language and publication bias in the review. Validity was assessed using appropriate criteria and the quality of the interventions was assessed, but limited use was made of this information in the synthesis. The use of narrative synthesis reflected the diversity of the interventions and outcomes and seemed appropriate. Rigorous methods were used to minimise errors and bias in the review, although it was unclear whether the validity assessment was performed in duplicate. The authors' conclusions reflected the evidence presented, but appeared overstated given that they are based on only three studies with methodological weaknesses. The uncertain clinical significance of the effects found should also be noted.

**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 required to identify the most effective components of Internet-based interventions and to evaluate their cost-effectiveness compared with traditional methods of delivery; such research should involve long-term follow up and use objective outcome measures.

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