

## Effectiveness of web-based interventions in achieving weight loss and weight loss maintenance in overweight and obese adults: a systematic review with meta-analysis

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### CRD summary

This review concluded that effectiveness of web-based interventions for weight loss or maintenance was unclear due to the small number of comparable studies. Higher usage of website features may have been associated with positive weight change, but it was unclear which features improved this effect. This was a robustly performed review and the authors' conclusions are likely to be reliable.

### Authors' objectives

Firstly, to assess the effectiveness of web-based interventions for weight loss and maintenance of weight loss in overweight and obese adults. Secondly, to identify which specific components of web-based interventions are associated with greater weight loss and maintenance and low attrition rates.

### Searching

English-language trials were identified through a search of MEDLINE, EMBASE, CINAHL, The Cochrane Library, Web of Science, PsycINFO, Australian Digital Theses Program and Dissertation & Abstracts from 1995. Reference lists of retrieved articles were searched.

### Study selection

Randomised controlled trials (RCTs) with at least one web-based intervention arm that evaluated weight loss or weight loss maintenance in overweight or obese (body mass index  $\geq 25$ ) patients aged over 18 years were eligible for inclusion. Interventions were considered web-based if participants received information and directly interfaced with the web. The primary outcome was percentage change in body weight.

Thirteen of the 18 included studies (reported in 20 publications) aimed to achieve weight loss and five studies focused on maintenance of weight loss. Length of interventions ranged from six weeks to two years. Most interventions included generic education material, a chatroom or forum and emails. Weight maintenance interventions compared web-based programs to minimal intervention, face-to-face group sessions and telephone follow-up. Control groups included minimal intervention, automated email feedback, email counselling and behavioural therapy. Enhanced features included weight management plans, online message boards, behavioural therapy and counselling.

Two reviewers independently selected studies for inclusion. Disagreements were resolved through discussion with a third reviewer.

### Assessment of study quality

Methodological quality was assessed by two independent reviewers who used a 10-item quality assessment scale from Joanna Briggs Institute that evaluated randomisation, blinding, allocation concealment and intention-to-treat and reliability of outcome measurement. Disagreements were resolved through discussion with a third reviewer.

### Data extraction

One reviewer extracted data on methodology, intervention effects and compliance with and intensity of the web-based intervention. Data extraction was checked by a second reviewer and disagreements were resolved by consensus. Means and standard deviations (SD) were used to calculate weighted mean differences (WMD) or standardised mean differences (SMD).

### Methods of synthesis

Pooled WMD or SMD and corresponding 95% confidence intervals (CI) were calculated. A fixed-effect meta-analysis was used where there was no evidence of statistical heterogeneity and a random-effects model was used if statistically significant heterogeneity was observed. WMD was used where the same measurement scales were used across studies. SMD was used where measurement scales varied.

Subgroup analyses investigated addition of behavioural therapy, addition of counselling and intensity of face-to-face interventions. Statistical heterogeneity was assessed using a  $X^2$  test ( $p < 0.10$  was considered substantial heterogeneity).

### Results of the review

Eighteen trials ( $n=5700$ ) were included in the review. Overall study quality was average. Three of the 18 studies met eight of the ten checklist requirements. Most studies conducted intention-to-treat analyses and measured outcomes appropriately. Quality concerns included lack of reporting for method of randomisation and allocation concealment.

**Weight loss:** There were no differences in weight loss between web-based programs and control or minimal intervention in three studies. Significant heterogeneity was observed for this outcome. Participants reported significantly greater weight loss in enhanced web-based programmes versus education-only web-programmes (WMD 2.24kg, 95% CI 1.27 to 3.21,  $p < 0.00001$ ; three trials). No significant heterogeneity was observed.

Subgroup analyses that investigated the addition of behavioural therapy did not show a significant difference between groups. The addition of counselling significantly increased weight loss (WMD 2.76kg, 95% CI 1.31 to 4.21,  $p = 0.0002$ ).

**Weight loss maintenance:** Participants in web-based programs gained significantly less weight compared to control or minimal intervention (WMD -0.30kg, 95% CI -0.34 to -0.26,  $p < 0.00001$ ; two trials). No

significant heterogeneity was observed. There were no significant differences reported between web-based interventions and face-to-face interventions.

Subgroup analyses reported no differences between groups for both frequent and minimal intensity face-to-face interventions.

#### **Authors' conclusions**

It was not possible to determine the effectiveness of web-based interventions in achieving weight loss or maintenance due to the small number of comparable studies. Higher usage of website features may have been associated with positive weight change, but it was unclear which features improved this effect or reduced attrition.

#### **CRD commentary**

This review addressed a clear question supported by appropriate inclusion criteria. Relevant databases were searched. The restriction to English-language articles may mean that some information was missed. Search terms were not reported. Publication bias was not considered in the report. Suitable methods were used throughout the review process to minimise risks of reviewer error and bias and this increased the reliability in the results. The validity assessment was appropriate, but was not carried through to results. It would have been helpful to see results for a subgroup of higher-quality studies.

Results were pooled using meta-analysis and heterogeneity was assessed. A lack of exploration of the heterogeneity that was found may mean that the results were more limited than they might otherwise have been. The decision to pool studies in a meta-analysis may not have been appropriate given the heterogeneity between studies, particularly when so few studies could be included in the analyses. In terms of methodology, this review was carried out robustly and the authors' conclusions are likely to be reliable.

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

**Practice:** Although web-based interventions had potential to achieve outcomes similar to other lifestyle interventions, it was unclear which components of web-based interventions were important for weight loss in overweight and obese people.

**Research:** Well-designed trials that compared web-based interventions against traditional methods of delivering lifestyle interventions or wait-list controls were needed. Studies were needed to investigate which components of web-based interventions were critical to achieving weight loss or maintenance.

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