Self-help interventions for weight loss in overweight and obese adults

Systematic review and meta-analysis

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What do we know about self-directed weight loss?

- Approximately a quarter of American and British adults are trying to lose weight\(^1\)

- The majority are doing so without professional help or formal weight loss programmes

- Self-directed programmes are being widely used, including websites, weight loss apps for smartphones, and web based methods of tracking weight related variables\(^2-4\)

Where might self-help programmes fit in?

• High prevalence of obesity and limited resources presents challenge to healthcare systems

• Trials of self-help interventions for weight loss can inform our knowledge about:
  o what types of self-directed weight loss strategies are most effective
  o which might be usefully highlighted to the public.

• Identifying the effective components of self-help interventions could also help improve the effectiveness of more intensive interventions.
Review aims

Despite the prevalence of self-directed weight loss attempts and the potential usefulness of self-help programmes for weight loss, comparatively little is known about their effectiveness and active ingredients.

We therefore set out to:

- Review the effectiveness of self-help interventions for weight loss
- Examine which strategies these interventions recommend
- Investigate relationships between intervention characteristics and weight change
Inclusion criteria (PICOS)

**P**articipants: adults with BMI ≥ 25 kg/m²

**I**nterventions: self-help programmes aiming to achieve weight loss through changes in diet or activity. Self-help defined as interventions that could feasibly be delivered in self-management context (e.g. used by individuals for a weight loss attempt not assisted by health care professionals, counsellors, or any other kind of person-to-person support).

**C**omparators: another self-help intervention or a minimal control

**O**utcomes: weight change at six and/or 12 months

**S**tudy design: randomized controlled trials
Coding intervention characteristics

Programme characteristics:
• Tailored and/or interactive, or neither (fixed)
• Format(s)
• Length of access to programme
• Recommended frequency of access

Self-management strategies:
• Interventions coded against pre-defined list of self-management strategies (Oxford Food and Activity Behaviour (OxFAB) taxonomy), developed prior to review by coding commonly used self-management weight loss resources
• Each intervention coded as yes/no/unclear for use of each type of strategy by two reviewers (21 types of strategy in total)
Data synthesis

- Outcome: difference in mean weight change between intervention and control groups at six and 12 months, using BOCF
- Random effects meta-analysis, with $I^2$ used to quantify statistical heterogeneity
- Subgroups: whether intervention was interactive and/or tailored
- Sensitivity analyses using complete case data and to test sensitivity to studies judged to be at high risk of bias
Results
Search results and included studies

3883 results retrieved
186 full text screened
23 studies met our criteria (43 references, 9,623 participants)

39 interventions:
- 18 tailored and interactive
- 6 interactive, not tailored
- 3 tailored, not interactive
- 12 fixed

18 studies included in quantitative synthesis (meta-analyses)
Frequency of recommended strategies

- Self-monitoring
- Support: Motivational
- Motivation
- Reward
- Planning content
- Imitation (modelling)
- Scheduling of diet and activity
- Information seeking
- Support: Buddying
- Support: Professional
- Impulse management

Number of interventions recommending use of strategy
Self-help interventions versus minimal controls, BOCF weight change at six months

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Intervention Mean</th>
<th>SD</th>
<th>Total</th>
<th>Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Mean Difference IV, Random, 95% CI</th>
<th>Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Tailored and interactive</td>
<td>-4.8</td>
<td>3.9</td>
<td>41</td>
<td>-1.9</td>
<td>3.4</td>
<td>33</td>
<td>12.0%</td>
<td>-2.90 [-4.56, -1.24]</td>
<td></td>
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<tr>
<td>Byrne 2006</td>
<td>-0.6</td>
<td>3</td>
<td>111</td>
<td>-0.9</td>
<td>4.5</td>
<td>110</td>
<td>15.0%</td>
<td>0.30 [-0.71, 1.31]</td>
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<tr>
<td>McConnon 2007</td>
<td>-5.3</td>
<td>5.8</td>
<td>34</td>
<td>-3.5</td>
<td>5.6</td>
<td>30</td>
<td>7.5%</td>
<td>-1.80 [-4.60, 1.00]</td>
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<tr>
<td>Morgan 2011</td>
<td>-5.1</td>
<td>5.4</td>
<td>53</td>
<td>-0.5</td>
<td>3.4</td>
<td>26</td>
<td>10.7%</td>
<td>-4.60 [-6.55, -2.85]</td>
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<tr>
<td>Morgan 2013</td>
<td>-1.3</td>
<td>3.8</td>
<td>81</td>
<td>-0.6</td>
<td>3.3</td>
<td>89</td>
<td>14.7%</td>
<td>-0.70 [-1.77, 0.37]</td>
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<tr>
<td>Shapiro 2012</td>
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<tr>
<td>Subtotal (95% CI)</td>
<td>320</td>
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<tr>
<td>Heterogeneity: Tau² = 2.94; Chi² = 24.96, df = 4 (P &lt; 0.0001); I² = 84%</td>
<td>Test for overall effect: Z = 2.11 (P = 0.04)</td>
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<tr>
<td>1.1.2 Interactive non-tailored</td>
<td>-2.4</td>
<td>4.3</td>
<td>180</td>
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<td>Greene 2013</td>
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<tr>
<td>Total (95% CI)</td>
<td>616</td>
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<tr>
<td>Heterogeneity: Tau² = 1.52; Chi² = 29.53, df = 7 (P = 0.0001); I² = 76%</td>
<td>Test for overall effect: Z = 3.57 (P = 0.0004)</td>
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<tr>
<td>Test for subgroup differences: Chi² = 1.77, df = 2 (P = 0.41), I² = 0%</td>
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</table>

Significant effects were detected within each subgroup

Statistical heterogeneity was substantial and not explained by differences between tailored/interactive compared to fixed programmes
Self-help interventions versus minimal controls, BOCF weight change at 12 months

- Results sensitive to one study at high risk of bias (49% intervention versus 70% control participants followed up at 12 months)
- Removing this study reduced statistical heterogeneity to low and yielded a significant effect in favour of the intervention
Interactive compared with fixed programmes, BOCF weight change at 6 months

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Tailored/interactive</th>
<th>Static</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>2.1.1 Tailored and interactive</td>
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</tr>
<tr>
<td>Adachi 2007</td>
<td>-2.3</td>
<td>2.7</td>
<td>46</td>
<td>-1.2</td>
</tr>
<tr>
<td>Carter 2013</td>
<td>-4.6</td>
<td>5.2</td>
<td>43</td>
<td>-2.9</td>
</tr>
<tr>
<td>Hersey 2012</td>
<td>-2.4</td>
<td>5.0</td>
<td>186</td>
<td>-2.1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.41</td>
<td>0.61</td>
<td>351</td>
<td>0.00</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>0.41</td>
<td>0.61</td>
<td>351</td>
<td>0.00</td>
</tr>
</tbody>
</table>

- Two studies also directly tested the addition of tailoring to interactive interventions
- Pooled results detected a small but significant effect in favour of tailored programmes (mean difference -0.41kg, 95% CI -0.61 to -0.20, $I^2 = 0$, n = 2,990).
- However, large majority of participants came from one study that suffered very high loss to follow-up, limiting confidence in this finding.
Conclusions
Summary of findings

• Self-help interventions can lead to modest but significant weight change at six months.

• Tailoring and interactivity of programmes appear to increase weight loss.

• Results were variable and the reasons for this heterogeneity remain largely unknown.

• In the small group of studies providing data at 12 months, weight loss was no longer significantly greater than minimal control; the effect size was comparable with that achieved at six months but was imprecisely estimated.
Implications

For health professionals and policy makers

- Even modest reductions in weight can have long-term health benefits for people who are overweight or obese ➔ health professionals can recommend self-help programmes as a first line intervention.

- Given potential scalability of self-help interventions, they have a place within a portfolio of population wide strategies to treat overweight and obesity.

For research

- Confidence in the above suggestions would be increased were we able to determine their effect at longer than 6 months; further studies reporting data at 12 months or longer would help clarify this situation.

- Identification of the most effective components of these interventions would also increase confidence.
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Any questions or a copy of the slides, please e-mail me on jamie.hartmann-boyce@phc.ox.ac.uk
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