Effectiveness of male-only weight loss and weight loss maintenance interventions: a systematic review with meta-analysis
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CRD summary
This review concluded that male-only weight-loss interventions may effectively engage and assist men with weight loss but more research was needed into weight-loss maintenance programmes. A lack of information about study participants and the poor quality of the small evidence base mean these conclusions may not be generalisable or reliable.

Authors' objectives
To investigate the effectiveness of male-only weight-loss and weight-loss maintenance interventions and to identify intervention characteristics associated with their effectiveness.

Searching
CINAHL, EMBASE, MEDLINE, PsycINFO, PubMed, SPORTDiscus, Scopus and Web of Science were searched up to May 2011 for studies published in English. Search terms were reported. Reference lists of included studies were searched.

Study selection
Eligible studies were experimental trials that evaluated weight-loss or weight-loss maintenance interventions that aimed to change behaviour or lifestyle in men aged 18 to 65 years who were overweight or obese. Obesity was defined as either World Health Organization body mass index (BMI) cut-offs or a body weight of 120% or more of ideal weight for height according to the 1983 Metropolitan Height and Weight Tables (BMI>28). Primary outcome measures were weight change or weight at baseline and at least one post-intervention measurement. Studies of bariatric surgery, anti-obesity medication or a supervised exercise or dietary regime that aimed to evaluate the effect of weight loss on other outcomes were excluded.

Interventions included weight-loss programmes with internet or telephone support and dietary feedback, information and activity sessions, reduced energy, low energy and very low energy diets. Control groups received minimal or no intervention or were placed on a waiting list. Intervention periods lasted for between three and 24 months.

One reviewer screened the abstracts and another checked their decisions; full papers were selected by two reviewers independently. Disagreements were resolved through discussion and consensus.

Assessment of study quality
Risk of bias was assessed with a tool adapted from the CONSORT statement and previously used quality criteria. Each study was categorised as high risk (score of zero to 3), medium risk (4 to 7) or low risk (8 to 10).

Two reviewers independently performed the assessment; disagreements were resolved by discussion.

Data extraction
Data for mean weight or mean weight change with standard deviations and percentage change were extracted by one reviewer.

Methods of synthesis
Results from randomised controlled trials of weight-loss interventions with true control groups were pooled using fixed-effect meta-analysis and reported as weighted mean differences with 95% confidence intervals. Heterogeneity was assessed with the $I^2$ statistic. Where there was more than one intervention group, the control group was divided proportionally. Other results were reported as a narrative synthesis. Interventions were considered effective if participants achieved a weight loss of at least 5%.

To investigate the relationship between study characteristics and intervention effectiveness, interventions were grouped...
according to whether or not they featured a particular characteristic and the proportions of effective interventions in each group were compared. A characteristic was considered related to effectiveness if the difference in proportions was at least 20%. Continuous data were analysed by dichotomising interventions that were greater than or less than or equal to the median value of all interventions.

Results of the review
Twenty-three studies (1,869 participants) were included: 12 randomised controlled trials, 10 pre-post single group studies and one non-randomised patient preference study. Four studies also evaluated a weight-loss maintenance intervention and followed up participants for between three and 12 months. Most studies were considered to be at moderate to high risk of bias (median quality score of 3). Only three studies were considered at low risk of bias. Seven studies used intention-to-treat analysis, five accounted for confounders in their analysis and five were adequately powered.

Meta-analysis of seven trials found a statistically significant benefit for weight-loss interventions with a greater reduction in weight compared with no intervention (weighted mean difference -5.66kg, 95% CI -6.35 to -4.97; I²=39%). The 11 non-randomised studies varied in interventions, duration and intensity of contact and most were at high risk of bias. Most reported a statistically significant reduction in mean weight after the intervention.

Of the four studies that assessed a weight-loss maintenance intervention, two were randomised controlled trials considered to be at moderate risk of bias and two were pre-post studies considered to be at high risk of bias. Both randomised trials reported statistically significant but comparable weight regain for intervention and control groups.

Study characteristics found to have a possible relationship with intervention effectiveness were a prescribed energy restriction, interventions that included group face-to-face contact, higher frequency of contact (>2.7 per month) and a younger population (≤42.8 years).

Authors' conclusions
Preliminary evidence suggested men-only weight-loss programmes may effectively engage and assist men with weight loss. High quality research was urgently needed, especially for weight-loss maintenance interventions.

CRD commentary
This review had clear and reproducible inclusion criteria. The search was limited to studies published in English and this increased risks of language and publication biases. Studies were selected and quality assessed by two reviewers independently. Only one author extracted data so there were risks of error and bias at this stage. The quality assessment used appropriate criteria and these results were reported fully. Meta-analysis was used only for studies with the same design and control group.

The evidence showed some benefit for weight-loss programmes but a lack of information about study participants and the poor quality of the small evidence base mean these conclusions may not be generalisable and reliable.

Implications of the review for practice and research
Practice: The authors stated that the evidence suggested that men-only weight-loss interventions were more likely to be successful if they included prescribed energy restriction, group face-to-face contact and three or more contacts per month on average.

Research: The authors stated a need for more randomised controlled trials that adhered to the CONSORT statement and with follow-up periods of at least one year. More research was needed to determine which components of weight-loss maintenance programmes were linked to successful long-term weight-loss outcomes, ideally with a maintenance intervention given for a number of years to identify a suitable timeframe for starting a maintenance programme. Research was also needed into differences in recruitment, retention and success rates of male participants in gender-sensitive programmes compared with those that provided a standard weight-loss programme to a male-only or mixed-sex population.

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