

Systematic review of long-term lifestyle interventions to prevent weight gain and morbidity in adults

Brown T, Avenell A, Edmunds LD, Moore H, Whittaker V, Avery L, Summerbell C

CRD summary

The authors of the review concluded that diet alone and with the addition of exercise and/or behaviour therapy demonstrated significant weight loss and improvement in metabolic syndrome and diabetes compared with no treatment control for at least two years. The reliability of the conclusions is unclear as they were based on analyses that contained only one or two studies.

Authors' objectives

To determine the effectiveness of long-term lifestyle interventions for prevention of weight gain and morbidity in adults.

Searching

Two systematic reviews (NICE report and HTA report) were used as sources of studies up to 2005. CAB abstracts, CCTR, CINAHL, EMBASE, MEDLINE and PsycINFO were searched without language restrictions for studies published between 2005 and August 2006. MEDLINE was additionally searched for studies published from September 2006 to August 2007. International Journal of Obesity and Obesity journals were handsearched from January 2006 to September 2007.

Study selection

Full reports of randomised controlled trials (RCTs) and controlled before-and-after studies of lifestyle interventions (diet, exercise, behaviour, environmental) published from 1990 onwards were eligible for inclusion in the review. Participants had to be adults (18 to 65 years) with body mass index (BMI) less than 35kg/m². Studies needed to report participant weight at least two years post randomisation. Studies in non-white populations were included if the ethnic group and setting were relevant to the UK population. Studies of exercise or behavioural therapy interventions had to describe the components of the intervention and underlying theory.

Interventions that targeted smoking cessation or salt reduction in addition to weight loss were excluded from the review. Also excluded were studies of people with eating disorders, pregnant women or severely mentally or physically handicapped adults.

Most studies were in USA and were secondary care based. There were participants of either sex. Mean age ranged from 40 to 60 years. Most studies recruited participants who had risk factors for disease, history of disease or disease (such as hypertension, type 2 diabetes and breast cancer). Mean baseline BMI was less than 30kgm² in around half of the studies.

Interventions fell into categories of either a definite intention to lose weight or no target for weight loss. Diets were categorised as: 600kcal/day deficit/low fat diet; low fat diet (1,000 to 1,600kcal/day deficit diet); and very low calorie diet (<1,000kcal/day deficit diet). The main outcome of interest was weight change. Other outcomes included death, stroke, heart disease, cancer, diabetes and metabolic syndrome.

The authors did not state how many reviewers performed study selection.

Assessment of study quality

The methods of study quality assessment were described in a previous review (see Other Publications of Related Interest). Quality criteria of method of randomisation, allocation concealment, assessor blinding and use of intention-to-treat (ITT) analysis were reported in appendices.

Data extraction

Data were extracted in order to calculate mean differences, odds ratios (OR) and risk ratios (RR) and their 95% confidence intervals (CI). Methods of data extraction were described in a previous review (see Other Publications of Related Interest).

Methods of synthesis

Weighted mean differences (WMD), odds ratios or risk ratios were combined in a fixed-effects model. Data from RCTs and before-and-after studies were analysed separately.

Results of the review

Forty studies were included in the review: 39 RCTs and one controlled before-and-after study (sample size ranged from 200 to approximately 49,000 participants). Follow-up ranged from 24 to 97 months. Twelve studies had good allocation concealment, two studies had blinded outcome assessors and 10 studies used ITT.

Interventions with a definite intention to lose weight (compared to control):

A 600kcal/day deficit diet was associated with a statistically significant reduction in weight at 36 months (WMD -3.49kg, 95% CI -4.63 to -2.35; one study). A low calorie diet was associated with a statistically significant reduction in weight at 24 months (WMD -7.00kg, 95% CI -10.99 to -3.01; one study) and at 36 months (WMD -6.10kg, 95% CI -10.71 to -1.49; one study in women treated for breast cancer). Weight Watchers was associated with a statistically significant reduction in weight at 24 months (WMD -2.70kg, 95% CI -3.95 to -1.45; one study). A 600kcal/day deficit diet or low fat diet that used meal replacements was associated with a statistically significant reduction in weight at 24 months (WMD -11.49kg, 95% CI -12.98 to -10.00; one study).

Diet and exercise was associated with a statistically significant reduction in weight at 24 months when compared with self-help (WMD -2.56 kg, 95% CI -3.34 to -1.77; three studies). Diet and exercise and behaviour therapy was associated with a statistically significant reduction in weight at 24 months (WMD -2.47kg, -3.18 to -1.77; two studies), at 30 to 36 months (WMD -2.04kg, 95% CI -2.70 to -1.39; two studies) and at 54 months (WMD -2.50kg, 95% CI -3.59 to -1.41; one study).

Interventions with no target for weight loss (compared to control):

A low fat non-reducing diet was associated with a statistically significant reduction in weight at 24 months (WMD -1.42kg, 95% CI -2.10 to -0.74; two studies). Diet and behaviour therapy was associated with a statistically significant reduction in weight at 24 months (WMD -1.01kg, 95% CI -1.34 to -0.68;

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two studies), at 36 months (WMD -1.77kg, 95% CI -1.94 to -1.59; three studies), at 48 months (WMD -0.52kg, 95% CI -0.85 to -0.19; two studies) and at 90 months (WMD -0.70kg, 95% CI -0.90 to -0.50; one study).

A number of other comparisons were reported. Most showed no statistically significant difference in weight.

There was no statistically significant difference between lifestyle interventions and control groups for death, stroke, heart disease and cancer outcomes.

Three studies (diet versus control, diet and exercise versus control, and diet and exercise and behaviour therapy versus control) showed a statistically significant reduced risk of type 2 diabetes up to six years (RR 0.68, 95% CI 0.57 to 0.82). Two studies (intensive low fat diet, exercise and psychological support, and Mediterranean diet and behaviour therapy) showed a statistically significant higher resolution of metabolic syndrome for up to three years (RR 2.52, 95% CI 2.08 to 3.05).

Authors' conclusions

Diet alone and with the addition of exercise and/or behaviour therapy demonstrated significant weight loss and improvement in metabolic syndrome and diabetes compared with no treatment control for at least two years.

CRD commentary

The review addressed a clear research question and was supported by detailed inclusion criteria. A NICE report and HTA report were used as sources of studies published before 2005. The review authors did not comment on the search strategy used in these two reports and it was unclear whether these searches were subject to language or publication bias. A number of databases were searched without language restrictions for studies published between 2005 and August 2006, which minimised the risk of language bias. It was unclear whether there were any attempts to locate unpublished material, so publication bias could not be ruled out. The review did not state how many reviewers performed study selection and it was unclear whether this process was subject to reviewer error or bias. Study quality of RCTs was assessed. The methods of study quality assessment and data extraction were not provided in this review, but were described in a previous review (see Other Publications of Related Interest) by the authors. Cross checking with the previous review revealed that these processes were carried out in a way that minimised reviewer error and bias. Methods of synthesis were appropriate.

The authors' conclusions represented the evidence presented, but the reliability of the authors' conclusions is unclear because individual meta-analyses contained just one or two studies, .

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated a need for future studies to be longer term, sufficiently powered and have detailed reporting of interventions, participants characteristics and outcome, economic and quality of life data.

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Bibliographic details

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Other publications of related interest

Avenell A, Broom J, Brown TJ, Poobalan A, Aucott L, Stearns SC, Smith WC, Jung RT, Campbell MK, Grant AM. Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement. *HTA* 2004; 8(21):1-194

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