

Effective **Health Care**

**Bulletin on
the effectiveness
of health service
interventions for
decision makers**

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The prevention and treatment of obesity

- The increasing prevalence of overweight and obesity is an important public health problem contributing to significant excess disease and mortality. Health of the Nation targets on obesity are unlikely to be met.
- Even modest weight loss is associated with health benefits.
- Progression of obesity in high-risk children may be prevented by family therapy. Prevention of obesity in adults may be achieved by community-based education programmes linked with financial incentives.
- Interventions to reduce sedentary behaviour can reduce overweight in children.
- Behavioural, diet, exercise and drug treatments have all been shown to be effective, to some extent, in treating obesity in adults, particularly when two or more approaches are used in combination.
- Most people begin to regain weight a few months after treatment. Longer term follow-up and use of maintenance interventions is necessary to sustain weight loss.
- Surgery is the most effective and possibly cost-effective approach for reducing weight in people with severe obesity.

A. Background

A.1 Health effects of obesity:

People who are obese or overweight have a higher risk of disease including coronary heart disease, diabetes, hypercholesterolaemia, hypertension, gall stones, degenerative joint disease¹ and obstructive sleep apnoea.^{2,3} Life expectancy is reduced by obesity, mainly through the effect of increased weight on related conditions. A recent review showed that even modest weight losses of up to 5 kg may produce important health benefits.⁴ Weight loss can also reduce the costs associated with treating some of these conditions.^{5,6}

A.2 Measurement of obesity: The body mass index (BMI) is frequently used as a measure of overweight and obesity (see Box). Interpretation of the BMI is limited because factors such as size of body frame, proportion of lean mass, gender, and age are not taken into account.⁷ Assessments such as the girth-height ratio (GHR) (waist circumference divided by height) give a measure of central obesity which is associated with an increased risk of cardiovascular mortality, hypertension, and non-insulin dependent diabetes.⁸ GHR has been shown, in prospective studies, to be a better predictor of cardiovascular risk than BMI.^{9,10}

A.3 Prevalence: Epidemiological surveys of England indicate that the prevalence of obesity is increasing.¹² In 1994 it was estimated that 13% of men and 16% of women aged 16 to 64 years were obese,⁸ around twice the corresponding rates for 1980.¹³ The prevalence of overweight in 1994 was 43% for men and 29% for women in the same age group, and is increasing.⁸ The prevalence of overweight and obesity in Scotland is similar¹⁴ and data for Wales also reveal an upward trend.¹⁵

The Health of the Nation strategy for England includes a target to

Classification of weight according to BMI level^{8,11}

| BMI (kg/m ²) | Description |
|--------------------------|-------------------------|
| 20 or less | Underweight |
| 20 to 25 | Desirable |
| 25 to 30 | Overweight |
| 30 to 40 | Obese |
| Over 40 | Morbidly/severely obese |

| | |
|-------------------------|---|
| Body Mass Index (BMI) = | $\frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$ |
|-------------------------|---|

reduce the prevalence of obesity in those aged 16 to 64 years to no more than 6% and 8% for men and women respectively by the year 2005.¹⁶ However, at the present rate of increase, this target is unlikely to be met.

Several reasons have been put forward to explain the national trends in obesity. The combination of increased dietary fat and decreased levels of physical activity mean that people do not always expend their energy intake. This has occurred despite a reduction in the total average energy consumption, suggesting that sedentary lifestyles are the most important factor.¹⁷ Increased eating outside the home, the tendency to eat 'little and often', and eating at times when energy expenditure is likely to be low (e.g. late in the evening) may also contribute to this trend.¹⁸

A.4 High risk groups: Certain groups of people are particularly likely to become obese. Children in families where one or more parents are overweight or obese are at greater risk of developing the condition.^{19,20} Risk of obesity is also associated with social class and level of education. The age-standardised prevalence of obesity in women is 21% in social class V, compared to 12% in class I. A similar trend exists for men (13% in social class V and 10% in social class I).⁸

The likelihood of obesity may vary between different ethnic groups; South Asians are at greater risk of developing central obesity when compared to Afro-Caribbeans and Caucasians.²¹ Obesity is also more prevalent in people with learning

disabilities such as Down's Syndrome.²²

Peoples' risk of becoming obese varies over the life cycle. Smoking cessation is another important risk factor for weight gain.^{23,24}

Health professionals may have a negative attitude to people who are obese or feel frustrated because successful treatment is often long-term or elusive and so they may not take positive action to help patients lose weight.^{18,25} Primary health care teams are not always adequately trained in the prevention and treatment of obesity, and may lack relevant resources.¹

Their importance as a risk factor for major disease and their high and increasing prevalence mean that obesity and overweight generate significant health service costs, variably estimated at around 1–5% of total health care expenditure.^{7,26}

This issue of *Effective Health Care* summarises research evidence on the effectiveness of interventions designed to prevent and treat obesity, and to maintain weight loss. Details of the review methods and results are available elsewhere.²⁷

B. Evaluating interventions

A systematic review of the research evidence was carried out. The relevant literature was identified by a search of computerised databases (including

MEDLINE, EMBASE, BIDS and PSYCHLIT), citations in identified reviews, and consulting experts.²⁸

Studies looking at weight before and after a treatment are likely to overestimate effectiveness because people given an inactive intervention (placebo effect), or whose weight is monitored (Hawthorne effect), have been shown to lose weight.²⁹ In order to assess whether an intervention is effective at producing a sustained reduction in weight it is important to compare the effects of the intervention with a similar group of people given a placebo. Therefore, the review concentrates on the results from randomised controlled trials (RCTs). However, in areas like the prevention of obesity, or the use of alternative therapies, where there are few RCTs, non-randomised controlled trials with a concurrent control group were also included.

Because short-term weight loss followed by weight gain is quite common,³⁰⁻³² the review focused on studies with at least a 1-year period of observation (including both treatment and follow-up). While these inclusion criteria reduce the number of studies examined, they increase the reliability of the results.

Ninety-nine studies^{5,33-128} met the review criteria. Many had methodological problems, such as small sample sizes and high rates of attrition, leading to low power and potential bias. Furthermore, studies recruiting participants by methods such as advertisements may not be generalisable to less motivated people seen in primary care. Most of the research was conducted in North America, with less than 10% of studies conducted in a UK setting. Studies on which some of the key conclusions of this report are based are summarised in the Table; details of all the studies reviewed are available elsewhere.²⁸

No studies of alternative therapies and none evaluating the effectiveness of commercial weight

loss programmes met the inclusion criteria. There have been very few economic studies evaluating the cost-effectiveness of interventions for the prevention or treatment of obesity.¹²⁹

Long-term decreases in body weight in the general population may need national and/or local initiatives aimed at the social and environmental conditions that contribute to increasing levels of obesity.¹³⁰ Policies focusing on the food industry,¹³¹ transport, access to exercise facilities, nutrition practices in school and the workplace and nutrition education have been suggested.¹² However, no reliable studies of such policies were identified and there is little good evaluative research on which to develop a national cost-effective strategy.

C. Preventing obesity

Very few rigorous studies of prevention have been carried out; one trial in children³³ and three in adults.³⁴⁻³⁶ Family therapy (defined as a model of treatment aimed at involving the family) was shown to be more effective in preventing the progression of obesity in 10-11 year olds than conventional dietary and exercise treatments or no intervention.³³

The prevention of adult obesity was addressed by three community studies examining an educational programme,³⁴ using a combination of education and financial incentives,³⁵ and using social learning.³⁶ All three studies made comparisons with no-intervention control groups. In the Stanford Five Cities Project, a multi-media education programme resulted in reduced average weight gain.³⁴ The provision of a monthly newsletter including information relevant to weight control combined with a financial incentive to maintain weight resulted in a large reduction in the proportion of people gaining

weight at 12 months, when compared to control in a sample of people of normal weight from the Minnesota Heart Health Program.³⁵

On the other hand a community-based programme using social learning and communication skills failed to demonstrate any statistically significant benefit, the BMI rising for both communities at similar rates over 10 years.³⁶

A joint Medical Research Council and Department of Health Nutrition Programme will commission research into identifying the characteristics of children who become obese adults, and into developing and evaluating interventions to prevent obesity.

D. Treating childhood obesity

Eleven small trials evaluating treatments of children with obesity were found,³⁷⁻⁴⁷ six from a single research group.^{39-41,44,45,47}

Two trials, both of good quality, suggest that an effective strategy is to use interventions designed to reduce sedentary behaviour (Table).^{42,47} The 'Shapedown' programme consisted of a variety of cognitive, behavioural, and affective techniques adapted to make successive small sustainable modifications in diet, exercise, and communication; restrictive diets were avoided, and parents were trained to support their children's weight loss efforts.⁴² Behaviour modification based on reinforcement (using rewards), aimed at reducing sedentary activity (e.g. watching television, playing computer games), was more effective than reinforcing increased physical exercise, or a combination of these interventions.⁴⁷

No long-term benefit for weight loss in children was demonstrated

by the addition of controlled exercise to diet.⁴¹ Other trials were too small to be interpretable.^{38,43} There is conflicting evidence over the effectiveness of treating obese parents and children together, and the involvement of parents in children's treatment programmes. The value of parental involvement may be of more use for the treatment of younger children (i.e. 5–8-year-olds).^{39,44,45}

E. Treating adult obesity

The range of interventions where reliable evaluation studies were found include dietary, exercise and behavioural approaches, either alone or in combination, and pharmacological and surgical treatments.

Behavioural, exercise and dietary interventions

E.1 Behavioural interventions alone: Behavioural treatment is based on the idea that much behaviour is learned and reinforced by particular social circumstances.¹³² Behavioural treatment using techniques such as conditioning and managed reinforcement¹³³ are commonly used for the management of obesity.

Thirteen RCTs evaluated various behavioural approaches to the treatment of obesity in adults.^{48–59,61} Overall, there is little reliable evidence that behavioural treatments by themselves are effective.

However, cue avoidance (avoidance of situations that provide the temptation to over-eat) may be more effective than cognitive approaches involving role-play to rehearse resisting overeating, or social pressure.⁵³ In addition, daily weight charting can increase the effectiveness of a behavioural programme.⁵⁹ Cognitive therapy (when effective) may have more impact when of longer duration.⁵⁶

There is no evidence of a difference between long-term effects of individual and group therapy.⁵⁷ Four studies assessing the effectiveness of spouse involvement in behavioural programmes were small in size and gave conflicting results.^{48–51}

E.2 Behavioural interventions with an exercise component:

Four trials evaluated exercise in conjunction with behavioural weight loss programmes.^{62–65}

Supervised aerobic exercise sessions resulted in more sustained weight loss than the provision of exercise education.⁶⁴ However, a comparison of supervised aerobic exercise with dietary education and no treatment was too small and potentially biased due to differential drop-out.⁶²

The combination of diet and exercise appeared to be more beneficial for weight loss than diet alone but light exercise, such as callisthenics and stretching, may be just as effective as moderate aerobic exercise, such as walking.⁶⁵

E.3 Dietary interventions alone:

Only two studies assessed diet alone, both examining the effects of dietary fibre.^{66,67} Fibre supplements were more effective than placebo at increasing weight loss when given in conjunction with a 1200–1600 kcal/day diet.⁶⁷ However, this does not appear to lead to a greater mean weight loss than a low fibre/low calorie diet.⁶⁶

E.4 Dietary interventions with a behavioural component:

Most studies of diet included a behavioural component.^{68–77,79,80} Two trials assessing very low calorie diets and standard behavioural therapy showed that these combined strategies were more effective than diet alone (Table).^{73,74}

Standard behavioural therapy combined with the provision of meal plans and grocery lists to obese women produced

significantly greater weight loss than standard behavioural therapy alone (Table).⁷⁹ A similar result was found when all required food was provided to participants. (Table).⁷⁷ However, the provision of food may not be practical as a routine intervention.

Counselling focused on the restriction of fat intake was superior to a focus on the restriction in calorie or calorie plus fat intake in patients without diabetes.^{75,76} However, people with non-insulin dependent diabetes receiving calorie and fat restricted diets lost more weight than those only restricting calories.⁶⁹

There was no evidence to suggest that behavioural therapy in conjunction with a prescribed diet is more effective in an inpatient than an outpatient setting.⁸⁰

Pharmacological interventions

The majority of studies in this area evaluate drugs which aim to reduce energy intake.

Fourteen studies examining pharmacological interventions were included in the review.^{81–94} The most commonly studied drug was the selective serotonin agonist dexfenfluramine. A pooling (Fig. 1) of the results of four randomised placebo controlled trials (including a 24 site multi-centre RCT)⁸¹ shows a statistically significant greater reduction in weight loss at one year in those receiving dexfenfluramine (-2.6 kg 95% CI: -3.8, -1.3).^{81–84} The selective serotonin re-uptake inhibitor fluoxetine was also associated with a greater initial weight loss compared to placebo.⁸⁵

However, a three-arm RCT found no significant difference between a group receiving dexfenfluramine (15 mg twice a day for 3 months) combined with 1 year of nutritionist consultations and groups receiving nutritionist consultations alone (either at home or in a clinic), and behavioural therapy.⁹³

Table 1 Summary of key studies in selected areas*

| Author (year) design | Participants, interventions, sample size | Key long term results |
|---|--|---|
| The prevention of childhood obesity | | |
| Flodmark et al (1993) ³³ Sweden RCT 14-18 month intervention | Swedish children (10-11 years old) identified in a school screening programme for obesity (BMI of >23kg/m ² , mean = 25.1 kg/m ²). Gp1. Family therapy - conventional treatment (diet counselling + encouragement to exercise) and family therapy (n=25). Gp2. Conventional treatment (n=19). Gp3. Untreated control group (n=50). Groups BMI comparable at baseline. | At 1-year post-intervention follow-up; Family therapy group showed smaller increase in BMI than control group (5.1% vs 12.0%, p=0.02) and fewer children with severe obesity (5% vs 29%, p=0.02). No differences between conventional and control groups were statistically significant. Attrition; No data on drop-outs recorded. Analysis carried out on an intention to treat basis. |
| The prevention of obesity in adults | | |
| Forster et al (1988) ³⁵ USA RCT 1-year community-based intervention | Participants < 115% of ideal weight from the Minnesota Heart Health Program. Gp1. Monthly newsletter including information relevant to weight control, participants recorded weight each month, financial incentive. Optional education course. (n=108). Gp2. No treatment control (n=111). Groups comparable at baseline except for the proportion involved in previous weight control programs (18% in treatment group and 30% in control group). | Mean weight change adjusted for height (±se) 1 year post-treatment; Gp1. -0.95±0.27kg Gp2. -0.14±0.27kg (p=0.03) 82% of the treatment group and 56% of the controls maintained or lost weight over the 1 year intervention (p<0.0001). Estimated annual net cost of the program was \$35 per participant. Attrition; Gp1. 6.5% Gp2. 2% Drop-outs were excluded from the analysis |
| Taylor et al (1991) ³⁴ USA 4 surveys of random households & a cohort in reference and intervention cities 6-year intervention | Participants in the Stanford 5 cities project aged 12-74 years. Gp1. Two-intervention cities - an extensive education programme using mass media, direct mailing, classes, seminars, and school curricula. Mean BMI=25.2kg/m ² (n=885). Gp2. Two control cities - no intervention. Mean BMI=24.8kg/m ² (n=784). Mean baseline BMI significantly lower in the control cities (p=0.03). Groups also differ with regard to ethnicity. | Survey results; BMI change (±se), baseline to year 6: Gp1. = 0.57± 0.22 Gp2. = 1.25± 0.23 (p<0.05) Cohort results; No significant effects of treatment on BMI. All groups gained weight. Cohort response rates 56-70% |
| Treating childhood obesity - reducing sedentary behaviour | | |
| Mellin et al (1987) ⁴² USA RCT 3 month intervention, 1 year follow-up | 12-18 year olds (15.6 years mean) recruited through local papers and notices to physicians and schools. Gp1. SHAPEDOWN program - Self-directed change format encouraging adolescents to make sustainable small modifications in diet, exercise, lifestyle and attitudes (n=37, relative weight 136.5%). Gp2. No treatment control (n=29, relative weight 129.5%). Groups comparable relative and actual weight comparable at baseline. | Relative weight loss (±sd) at 1 year follow-up compared with baseline; Gp1. -9.9±14.98% (p<0.01) Gp2. -0.1±13.2% (ns) Attrition; Overall rate was 16% Data were analysed on an intention to treat basis. |
| Epstein et al (1995) ⁴⁷ USA RCT 4 months of weekly treatment, followed by bimonthly meetings up to 1 year | Obese 8-12 year olds (10.1 years mean age) recruited through radio announcements, TV commercials, and direct referrals who were 20-100% overweight (mean =52%), neither parent greater than 100% overweight, one parent willing to attend meetings A traffic light diet was used with children and parents (1000-1200 kcals/day). 61 families entered treatment, group size not reported. Gp1. Sedentary group - reinforced decreasing the amount of time they engaged in certain sedentary activities Gp2. Exercise group - reinforced increasing physical activities. Gp3. Combined group - both of the above. Groups comparable at baseline. | Mean change in % overweight at 1 year; Gp1. -18.7% Gp2. -10.3% Gp3. -8.7% Statistically significant reductions in body fat between the sedentary (-4.7%) and exercise groups (-1.3%) at 1 year (p<0.05). Attrition; Overall rate was 9.8%. Drop-outs were excluded from the analysis. |

Table 1 Continued

| Author (year) design | Participants, interventions, sample size | Key long term results |
|--|--|--|
| Behavioural interventions with a dietary component | | |
| Wadden et al (1986) ⁷³ USA 6-months intervention, 12-months follow-up | Subjects at least 25kg overweight recruited by newspaper ads (mean baseline weight around 109kg). Gp1. Very low calorie diet alone. Month 1 1000–1200kcal, months 2 & 3 400–500kcal, month 4 return to conventional foods (n=15). Gp2. Standard behavioural therapy alone. 1000–1200kcal diet throughout. Taught traditional behaviour methods of weight control (n=16). Gp3. Very low calorie diet + standard behaviour therapy. As for Gp1 plus extra two months 1000–1200 kcal diet. Extensive behaviour therapy (n=19). Groups comparable at baseline for age, height, weight and percentage overweight. | Mean weight change (±sd) at 1-year follow-up; Gp1. -4.7±7.3kg Gp2. -9.5±6.7kg Gp3. -12.9±9.3kg Weight loss for the combined treatment was significantly greater than that for diet alone (p<0.05). Men lost more than women both at post treatment and at 1-year follow-up Attrition: Gp1. 0% Gp2. 0% Gp3. 10.5% Drop-outs were excluded from the analysis. |
| Wadden et al (1989) ⁷⁴ USA 6-months intervention, 1 and 5 years follow-up | Adult women, screened to eliminate any contra indications to VLCD (mean baseline BMI±sd = 39.4±0.8kg/m ²). Gp1. Very low calorie diet alone (n=23) Gp2. Behaviour therapy alone (n=22) Gp3. Very low calorie diet plus behaviour (n=31) Gps 1 & 3 were given a 400 – 500 kcal/day diet for 2 months and 1000 –1200 kcals for the remainder of treatment. Gp2 received 1200 kcals diet for the entire 6 months. No data on group comparability. | Mean weight change at 1 and 5 years; Gp1. -4.7kg, +1.0kg Gp2. -6.6kg, +2.7kg Gp3. -10.6kg, + 2.9kg Effect significant (p<.05) at 1 year, with the two behavioural treatments superior to diet alone. No significant differences between groups at 5 years. 64% regained all weight lost. 5% maintained all weight loss. Attrition: Overall rate was 14.6%, evenly distributed across the conditions |
| Wing et al (1996) ⁷⁹ USA 26 week intervention, 1-year follow-up | Healthy women, 15–55 years, not pregnant, were recruited (mean baseline BMI =32kg/m ²). Gp1. Standard behavioural therapy only (n=40) Gp2. Standard behavioural therapy plus written meal plans and weekly grocery list (n=41) Gp3. As for Gp 2 plus food provision. Cost of food shared by participants (n=41) Gp4. As for Gp 3 except that food provided free of charge (n=41) Groups were comparable at baseline. | Mean weight change at 1 year follow-up compared to baseline Gp1. -3.3kg Gp2. -6.9kg Gp3. -7.5kg Gp4. -6.6kg Weight loss for Gp1 was statistically significantly smaller than those in Gps 2–4 (p<0.02). Attrition: 12% by the 1 year follow-up. No statistically significant differences in drop out rates between groups. |
| Jeffery et al (1993) ⁷⁷ and (1995) ⁷⁸ USA 18-month intervention and 12-month follow up | Healthy adults aged 25–45 years (mean baseline BMI = 31kg/m ²). Gp1. No treatment control group (n= 40, mean BMI 31.1, mean weight 88.2kg). Gp2. Standard behavioural therapy (n = 40) Gp3. Standard behavioural therapy plus food provision (prepacked meals) (n = 40) Gp4. Standard behavioural therapy plus financial incentives. Payments made according to weight loss (n= 41) Gp5. Standard behavioural therapy plus food provision plus financial incentives (n= 41) Groups were comparable at baseline. | Mean change in BMI between baseline and 18 month follow-up Gp1. -0.2 Gp2. -1.8 Gp3. -2.5 Gp4. -1.5 Gp5. -2.3 Statistically significant greater loss in the food provision groups (3 and 5) than in control (p <0.0001). No effect for financial incentives or for the interaction of food provision and incentives Attrition: 15% at 18 months, which differed between groups (p = 0.03). |
| Maintenance of weight loss | | |
| Perri et al (1984) ¹¹⁴ USA 14-weeks weight loss programme, 21-month maintenance intervention | Healthy adults, aged 21–60 years receiving an initial behavioural weight loss programme. Maintenance interventions Gp1. Standard behavioural therapy plus booster sessions with therapist (n=26). Gp2. Standard behavioural therapy plus multicomponent programme, including the formation of peer groups (n=30). Groups were comparable at baseline for weight and percentage overweight. | Mean (±sd) weight change at 21 months Gp1. -0.4±3.6kg Gp2. -4.5±7.0kg Statistically significant between group difference in maintenance of weight loss (p<0.01). Attrition: 23% by the end of the 21 month maintenance program (all drop-outs were from Gp 1, statistically significant between group difference, p<0.05). Drop-outs excluded from analysis. |

Table 1 Continued

| Author (year) design | Participants, interventions, sample size | Key long term results |
|--|--|--|
| <p>Perri et al (1988)¹¹⁵ USA</p> <p>20-weeks weight loss programme, 26-weeks maintenance programme, 12-month follow-up (from end of maintenance programme).</p> | <p>Healthy adults, 22–59 years, who received an initial 20-week behavioural weight loss programme (mean baseline weight of treatment groups around 97kg).</p> <p>Maintenance interventions:</p> <p>Gp1. Control: no further contact with therapists (n=21, mean baseline weight 89kg).</p> <p>Gp2. Continued contact: fortnightly behavioural sessions focusing on a problem solving approach (n=25).</p> <p>Gp3. Social influence maintenance: As for Gp 2 with addition of monetary group contingencies for programme adherence, participant led lectures, and peer support (n=25).</p> <p>Gp4. Exercise: As for Gp 2 plus an aerobic exercise maintenance regime (n=26).</p> <p>Gp5. Combined: Combination of continued contact, social influence and exercise as described above (n=26).</p> <p>Comparability of groups at entry to maintenance programme was not reported.</p> | <p>Mean (±sd) weight change at end of 18 month follow-up</p> <p>Gp1. -3.6±6.2kg Gp2. -11.4±12.1kg Gp3. -8.4±7.5kg Gp4. -9.1±6.4kg Gp5. -13.5±15.2kg</p> <p>Statistically significant superior maintenance of weight loss when groups 2–5 were compared to group 1 (p<0.01).</p> <p>Attrition: 23% during initial weight loss intervention. No statistically significant differences in attrition rates. Drop-outs not included in the data analysis.</p> |
| <p>Kramer et al (1986)¹¹⁶ USA</p> <p>1-year maintenance programme following a 15-week weight loss programme.</p> | <p>Healthy adult participants who had lost at least 10% of their body weight after a 15-week behavioural weight loss programme.</p> <p>Maintenance interventions:</p> <p>Gp1. Control: No contact with therapists except for assessment at one year and an interim reminder letter (n=28).</p> <p>Gp2. Skills focus: Attended monthly meetings for one year, during which subjects were trained in dietary and exercise behaviours to produce weight loss maintenance (n=28).</p> <p>Gp3. Weight focus: Attended monthly meetings for one year, during which subjects were trained in the use of problem solving strategies (n=29).</p> <p>Financial incentive contracts were used in all groups, both during the weight loss and maintenance phases, whereby money was refunded at different stages in accordance with successful weight related outcomes.</p> <p>Groups were reported to be comparable at baseline and at the start of the maintenance programme.</p> | <p>Mean (±sd) weight change at end of 1 year maintenance program</p> <p>Gp1. -8.0±8.2kg Gp2. -7.0±5.9kg Gp3. -8.5±7.0kg</p> <p>All groups had regained approximately 40% of initial weight loss by the end of the maintenance intervention. No statistically significant differences.</p> <p>Percentage of subjects maintaining original weight loss</p> <p>Gp1. 18% Gp2. 14% Gp3. 32%</p> <p>Attrition: 2 dropped out, excluded from the analysis.</p> |
| <p>Perri et al (1984)¹²¹ USA</p> <p>15-week intervention, 1-year follow-up</p> | <p>129 participants (numbers per group not given).</p> <p>Gp1. Non-behavioural therapy plus no further contact. Gp2. Behaviour therapy plus no further contact. Gp3. Behaviour therapy plus relapse prevention training plus no further contact. Gp4. Non-behavioural therapy plus post-treatment contact by mail and phone. Gp5. Behaviour therapy plus post-treatment contact by mail and phone. Gp6. Behaviour therapy plus relapse prevention training plus post-treatment contact by mail and phone.</p> <p>Groups weight and percentage overweight comparable at baseline.</p> | <p>Weight change at 1 year follow-up;</p> <p>Gp1. -3.15±4.76kg Gp2. -6.27±6.1kg Gp3. -2.96±3.60kg Gp4. -6.15±5.00kg Gp5. -5.76±4.16kg Gp6. -10.3±11.39kg</p> <p>Attrition: 22% attrition rates did not differ significantly between groups. Subjects who dropped out did not differ from subjects who completed treatment.</p> |
| <p>Stevens et al (1993)¹²⁵ USA</p> <p>18-month intervention/maintenance</p> | <p>Adult participants, 30 – 54 years, with diastolic blood pressure of 80–89 mm Hg (mean BMI±sd 29.5±2.8).</p> <p>Gp1. Intervention consisted of 14 weekly group meetings followed by monthly maintenance sessions giving training in behavioural self-management techniques (n=308).</p> <p>Gp2. Controls, received usual care (n=256).</p> <p>Groups were comparable at baseline.</p> | <p>After 18 months, 45% of the men and 26% of women in the intervention group had met their weight loss goal of 4.5kg, compared with 12% and 18% of the control group.</p> <p>The difference in weight loss between the intervention and control groups (mean±se) at 18 months was 3.9±0.4kg overall (p<0.001), 4.7±0.5kg for men, and 1.8±0.8kg for women (p<0.01).</p> <p>Attrition: overall 7.1%</p> |

* Details of all trials included in the review are presented in a forthcoming CRD Report

In the USA a combination of fenfluramine (a variant of dexfenfluramine) and a sympathomimetic drug, phentermine is often used because of the possibility of achieving appetite suppression with lower doses and less side-effects. However, this combination has only been evaluated in placebo controlled trials of short duration^{90,135} and longer-term effectiveness has not been reliably evaluated. No statistically significant difference in long-term weight loss was found between long-term continuous and intermittent use of this combination.⁹⁰

Drug therapy in the UK is currently limited to 3 months;¹³⁶ this may be unjustified as benefits have been demonstrated in trials of up to 6 months of treatment. However weight loss tends to plateau by about 6 months and there is a tendency to partial weight regain despite continued drug therapy.¹³⁴

Side-effects such as gastrointestinal disturbances, have been observed in those taking centrally acting appetite suppressants. These effects are usually not severe and are transient. The risk of pulmonary hypertension has been shown to increase when such treatment is used for a total period of greater than three months,¹³⁷ however the absolute risk is still very low.¹³⁰

The availability of appetite suppressants has led to a 'drug

frenzy' in the USA.¹³⁰ It is important that anti-obesity medication is used cautiously and only as an adjunct to diet and lifestyle management.^{14,130}

Two new drugs in this area, sibutramine and orlistat, are under study. Sibutramine is a serotonin and noradrenergic reuptake inhibitor, whilst orlistat works by reducing the absorption of dietary fat. A multicentre double blind RCT of sibutramine (10 mg and 15 mg once daily for 1 year) showed weight loss during the first 6 months, with weight remaining stable for the following 6 months. At 12 months, average weight loss was 1.6 kg for the placebo group, and 3.3 kg and 4.4 kg for the 10 mg and 15 mg sibutramine groups respectively.⁹⁴

Surgical interventions

Surgical treatment is normally considered only in people with morbid obesity (see Box p.2) because it is associated with a higher risk of premature death, and when less invasive methods of weight loss have failed.¹¹

Fifteen studies of surgery met the inclusion criteria. Jejunoileal bypass, vertical banded gastroplasty and gastric bypass have all been found to produce a significant weight loss. However, the jejunoileal bypass procedure is associated with long term complications, and is no longer recommended. Six out of the seven RCTs showed gastric bypass to result in more weight loss 1

year post-operatively (45-65 kg), compared to gastroplasty (30-35 kg), with low early post-operative mortality.^{96,97,99,100,104,106,107}

In general the weight loss associated with surgical interventions is greater and more sustained than that achieved by non-surgical methods. Surgery however, is associated with complications such as revision of the initial surgery, vitamin and mineral deficiencies, associated mortality, feeling of fullness, dizziness, nausea and a desire to lie down after eating (dumping syndrome).

Surgery was found to be more cost-effective than medical interventions in a poorly controlled trial.¹³⁸ Surgical costs may possibly be reduced by reducing the postoperative stay¹³⁹ or by laparoscopic techniques.¹⁴⁰

A large non-randomised matched controlled trial is being undertaken in Sweden, that will compare the effect of different surgical and non-surgical interventions for obese men and women on long-term weight loss, comorbidity, quality of life and costs.¹⁴¹

F. Maintenance of weight loss

Despite the effectiveness of several interventions in promoting short-term loss, weight regain is common. It is important therefore, to assess the effectiveness of strategies for the maintenance of weight loss. These may be in the form of interventions specifically for maintenance, or comprehensive integrated treatment and maintenance regimes.

F.1 Maintenance only: Ten trials were identified that specifically evaluated weight loss maintenance interventions. Seven of these were concerned with behavioural programmes, mainly looking at continued contact.¹¹⁰⁻¹¹⁶

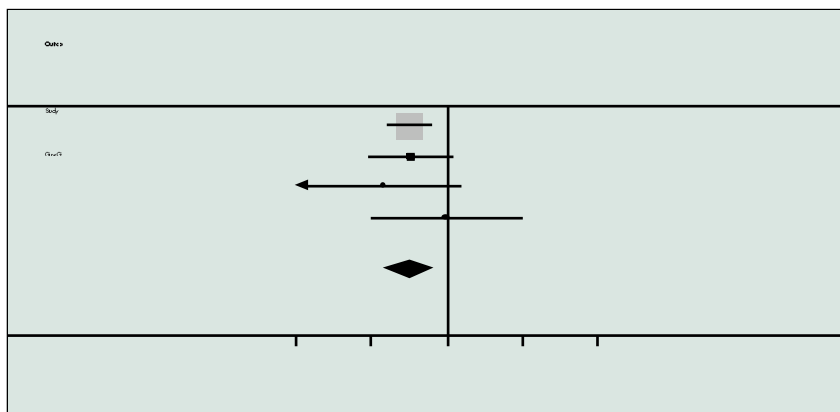


Fig. 1 Meta-analysis of trials examining dexfenfluramine versus placebo

One of these studies found that a combination of maintenance interventions led to a significantly greater amount of sustained weight loss when compared to a no-maintenance control (Table).¹¹⁵ Another showed that adding self-help peer groups to therapist-led maintenance programmes improved maintenance over a 21 month period (Table).¹¹⁴

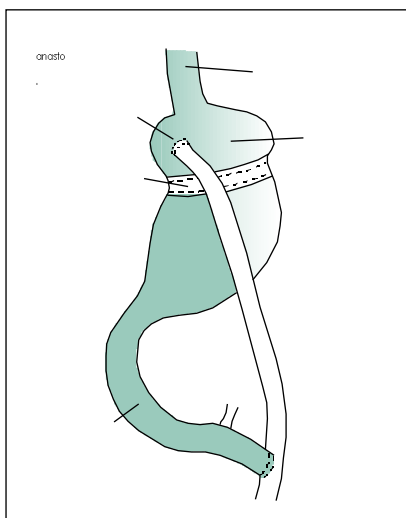


Fig. 2 Gastric bypass - Roux-en-Y technique

Two studies showed no differences between different intensities of patient/therapist contact at the end of 1 year.^{112,113}

A comparison of a skills focus group, a weight focus group, and a no-maintenance control group found that though all groups regained approximately 40% of weight loss, more people maintained initial weight loss in the weight focus group (32%), when compared to skills focus training (14%) and no treatment (18%) (Table).¹¹⁶

The drug, sertraline (a SSRI), did no better than placebo, when administered alongside relapse prevention training.⁹²

F.2 Comprehensive programmes: Combined treatment and maintenance programmes were evaluated in 11 trials.^{6,119-128} One of the most effective included behavioural therapy, relapse prevention training and continued

therapist contact by mail and telephone (Table).¹²¹ Patients who received this maintained their original weight loss (10kg) over the year.

In people who were both overweight and hypertensive, self-management techniques and lifestyle changes followed by continued therapist contact during the maintenance phase resulted in greater sustained weight loss than a 'usual care' control treatment (Table).¹²⁵ A further study looking at people who were overweight with high-normal diastolic blood pressure found that self-management techniques used in conjunction with moderate exercise, followed by relapse prevention training produced a small sustained greater weight loss (2 kg) at three years when compared to no active treatment.⁶

The involvement of the family or spouse in both weight loss and maintenance phases may be of some benefit.^{119,124}

G. Implications

- Primary health care teams to be more actively involved in identifying overweight patients, helping them to reduce weight and monitoring treatment.¹⁴
- Since there are health benefits associated with even modest weight loss, programmes should not necessarily aim to attain an ideal body weight.
- Family therapy may be effective in the prevention of obesity in children. For the treatment of obesity in children, interventions aimed at reducing sedentary behaviour may be useful.
- Community-based education strategies, especially when combined with financial incentives, may help prevent obesity in adults.

- Behavioural interventions, such as cue avoidance, combined with diet and or exercise appear to be effective. These may be more effective if of longer duration.

- Pharmacological interventions, for example dexfenfluramine and SSRIs, are effective for up to 9 months.

- Because weight regain is common, long-term follow-up and maintenance strategies (such as self-help groups) should be an integral part of any weight loss programme.

- Surgical interventions, especially gastric bypass and vertical banded gastroplasty, have been shown to be effective for people with morbid obesity.

Implications for research

- The cost-effectiveness of obesity-related interventions need to be addressed. Future research should be of good methodological quality, preferably using well controlled large experiments with long-term follow-up. Qualitative research should also be used to help understand the reasons for individual differences.
- Educational methods for encouraging health care professionals to improve the delivery of weight loss and maintenance interventions, need to be explored.
- Since levels of physical activity are modifiable,¹⁴² the value of strategies to reduce sedentary behaviour in both children and adults needs to be examined in a UK setting.
- The cost-effectiveness of commercial weight loss programmes and alternative therapies (e.g. acupuncture and hypnosis), should be investigated.

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The *Effective Health Care* bulletins are based on a systematic review and synthesis of research on the clinical effectiveness, cost-effectiveness and acceptability of health service interventions. This is carried out by a research team using established methodological guidelines, with advice from expert consultants for each topic. Great care is taken to ensure that the work, and the conclusions reached, fairly and accurately summarise the research findings. The University of York accepts no responsibility for any consequent damage arising from the use of *Effective Health Care*.

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