Effective management of obesity

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Introduction
This paper is based on Effective Health Care Vol 3, No 2.
People who are obese or overweight have a higher risk of disease including coronary heart disease, diabetes, hypercholesterolaemia, hypertension, gall stones, degenerative joint disease, and obstructive sleep apnoea, and thereby reduced life expectancy.1 Even modest weight loss of around 5 kg may produce important health benefits and reduce the costs associated with treating some of these conditions.

Recent epidemiological surveys in Britain indicate that the prevalence of obesity in men and women aged 16 to 64 is about 13% and 16% respectively2 3 (double the rates in 1980)4 and increasing.5 This trend is likely to be due to a combination of increased dietary fat and decreased levels of physical activity.6

Health professionals may have a negative attitude to people who are obese; they may lack interest in the condition and feel frustrated because successful treatment is often long term or elusive4 9 and primary healthcare teams are not always adequately trained in the prevention and treatment of obesity so they may not take positive action to help patients lose weight.1

This paper summarises the results of a systematic review of evaluations of interventions to reduce obesity and overweight presented in a recent Effective Health Care Vol 3, No 2, and published in full elsewhere.10 11

Methods
The relevant literature was identified by a search of computerised databases (including MEDLINE, EMBASE, BIDS, and PSYCHLIT), citations in identified reviews, and consulting experts. Only the results from randomised controlled trials with at least one year per period of observation (including both treatment and follow up) were included (in the case of prevention of obesity, or the use of alternative treatments, non-randomised controlled trials with a concurrent control group were also included). Data at each stage of the review were checked by two reviewers.

Results
Ninety nine studies contained in 96 full articles and one abstract12-108 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, and only 6% carried out analysis on an intention to treat basis. Furthermore, studies recruiting participants by methods such as advertisements may not be generalisable to less motivated people seen routinely in primary care. The table summarises the studies on which some of the key conclusions of this paper are based, and full details are available elsewhere.11

No studies of alternative treatments and none evaluating the effectiveness of commercial weight loss programmes—such as those provided by Weight Watchers or Slimming World—met the inclusion criteria and few economic evaluations have been published.109

Long term decreases in body weight in the general population may need national or local initiatives aimed at the social and environmental conditions that contribute to increasing levels of obesity.110 However, no reliable studies of such policies were identified.

PREVENTION
Only one preventive trial in children12 and three in adults were found (table).13-15 Family treatment (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.12

The prevention of adult obesity was considered by three community studies which made comparisons with no-intervention control groups. Both those using an educational programme alone11 and those with added financial incentives12 resulted in reduced average weight gain. The trial of social learning and communication skills, however,13 failed to show any benefit.

TREATING CHILDHOOD OBESITY
Eleven trials evaluating treatments of children with obesity were found.16-26 All had fewer than 40 participants in each group, and six were carried out by a single research group.18-20 23 24 26

Two trials, both of good quality, suggest that an effective strategy is to use interventions designed to reduce sedentary behaviour (table).21 26 The “Shapedown” programme consisted of various cognitive, behavioural, and affective techniques adapted to make successive small sustainable modifications in diet, exercise, and communication; restrictive diets
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Table 1 Summary of key studies in selected areas

<table>
<thead>
<tr>
<th>Author (year), design</th>
<th>Participants, interventions, sample size</th>
<th>Key long term results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet (1995)</td>
<td>Swedish children (10-11 years old) identified in a school screening programme for obesity (BMI 21.5 kg/m²). Group 1: family treatment - conventional treatment (diet counselling + exercise encouragement to families and family treatment) (N=19). Group 2: conventional treatment (N=19). Group 3: untreated control group (N=20). Groups BMI at baseline comparable at baseline</td>
<td>At 1 year postintervention follow up. Family treatment group showed more women (51.5% vs 12.0%, P=0.02) and fewer children with severe obesity (5% vs 29%, P=0.002). No significant effect of the treatment group and 56% of the controls maintained or lost weight over the 1 year intervention period (P=0.002). Overall mean BMI at the end of the intervention was 56% lower in the treatment groups. No data on dropouts reported. Analysis carried out on an intention to treat basis.</td>
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<tr>
<td>Forrest (1988)</td>
<td>US, RCT, 1 year community based intervention</td>
<td>Mean weight change adjusted for height (SE) 1 year posttreatment. Group 1: 5.9% (0.3), Group 2: 3.5% (0.2), Group 3: 2.3% (0.2). Significant difference of the treatment group and 56% of the controls maintained or lost weight over the 1 year intervention period (P=0.002). Overall BMI of the intervention groups was 56% lower at the end of the intervention. No significant effects of treatment on BMI at 12 months. Cohort results. No significant differences in mean BMI between groups at 9 years. 44% regained all weight lost. 5% maintained all weight lost. Attrition. Overall rate was 14.6%, evenly distributed across the conditions.</td>
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<tr>
<td>Taylor et al. (1996)</td>
<td>US, 4 surveys of random households and a cohort in reference and intervention cities, 6 year intervention</td>
<td>Mean absolute weight loss (SD) at 1 year follow up compared with baseline. Group 1 = -9.1 (4.9), Group 2 = -0.1 (13.3). NS. Attrition. Overall rate was 16%, data were analysed on an intention to treat basis.</td>
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<tr>
<td>Mellin (1996)</td>
<td>US, RCT, 3 month intervention, 1 year follow up</td>
<td>Relative loss (SD) at 1 year follow up compared with baseline. Group 1 = -4.7 (7.3) kg, Group 2 = -2.9 (6.7) kg, Group 3 = -12.9 (9.2) kg. Weight loss for the combined treatment was significantly greater than that for diet alone (P=0.05). Men lost more weight than women 1 year follow up. Attrition. Group 1: 0.6%, Group 2: 5.2%, Group 3: 5.7%. Dropouts were excluded from the analysis.</td>
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<tr>
<td>Epstein (1996)</td>
<td>US, RCT, 4 months of weekly treatment, followed by bi-monthly meetings up to 1 year</td>
<td>Mean change in % overweight at 1 year. Group 1 = -18.7%, Group 2 = -13.2%, Group 3 = -8.7%, significant reductions. 21% body fat for the remainder of the intervention. Attrition. Overall rate was 9.8%, dropouts were excluded from the analysis.</td>
</tr>
<tr>
<td>Wadden et al. (1996)</td>
<td>US, 6 months intervention, 12 months follow up</td>
<td>Mean weight change (SD) at 1 year follow up. Group 1 = -4.7 (7.3) kg, Group 2 = -2.9 (6.7) kg, Group 3 = -12.9 (9.2) kg. Weight loss for the combined treatment was significantly greater than that for diet alone (P=0.05). Men lost more weight than women 1 year follow up. Attrition. Group 1: 0.6%, Group 2: 5.2%, Group 3: 5.7%. Dropouts were excluded from the analysis.</td>
</tr>
<tr>
<td>Wing et al. (1996)</td>
<td>US, 26 week intervention, 1 year follow up</td>
<td>Mean weight change (SD) at 1 year follow up compared to baseline. Group 1 = -3.3 (5.9) kg. Group 2 = -6.9 (4.5) kg. Group 3 = -6.6 (4.5) kg. Weight loss for group 1 was significantly smaller than those in group 2 and 3. Weight loss for group 1 was significantly smaller than those in group 2 and 3. Attrition. 12% by the 1 year follow up. Significant differences in drop out rates between groups.</td>
</tr>
<tr>
<td>Kramentz (1986)</td>
<td>US, 1 year maintenance programme following a 15 week weight loss programme</td>
<td>Mean weight change at 21 months. Group 1 = -0.4 (3.6) kg. Group 2 = -4.7 (7.0) kg. Significant between group difference (P&lt;0.001). Attrition. Overall drop out rate between the 1 month maintenance programme (all dropouts were from the maintenance phase). Group 1: 4.7%, Group 2: 8.2%, Group 3: 17.1%. Dropouts excluded from analysis.</td>
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<tr>
<td>Perri et al. (1988)</td>
<td>US, 15 week intervention, 1 year follow up</td>
<td>Mean weight change at end of 18 month follow up. Group 1 = -3.6 (6.2) kg, Group 2 = -5.1 (8.2) kg, Group 3 = -5.7 (7.5) kg. Attrition. 23% during initial weight loss maintenance phase, 44% in attrition rates. Dropouts not included in the data analysis.</td>
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<tr>
<td>Stevens et al. (1993)</td>
<td>US, 18 month intervention/maintenance</td>
<td>Mean weight change at end of 1 year maintenance programme. Group 1 = -9.0 (8.2) kg, Group 2 = -7.0 (5.9) kg, Group 3 = -8.5 (7.0) kg, all groups had regained about 40% of initial weight loss by the end of the maintenance intervention. No significant differences. Percentage of subjects maintaining original weight loss. Group 1 = 18%, Group 2 = 14%, Group 3 = 32%. Attrition. 2 dropped out, excluded from the analysis.</td>
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*All details of trials included in the review are available.11*
were avoided, and parents were trained to support their children’s weight loss efforts.\(^\text{21}\) Epstein et al\(^\text{21}\) found that behaviour modification based on reinforcement (using rewards), aimed at reducing sedentary activity—for example, watching television, playing computer games—was more effective than reinforcing increased physical exercise, or a combination of these interventions.

No long term benefit for weight loss in children was found by the addition of controlled exercise to diet.\(^\text{40}\) 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 greater for the treatment of younger children (5–8 year olds).\(^\text{18}\)

**Dietary interventions with a behavioural component**

Most studies of diet (12 randomised controlled trials) included a behavioural component.\(^\text{41-58, 59}\) Two trials assessing very low calorie diets and standard behavioural treatment showed that these combined strategies were more effective than diet alone (table).\(^\text{52-53}\) Standard behavioural treatment combined with the provision of meal plans and grocery lists produced significantly greater weight loss than standard behavioural treatment alone (table).\(^\text{56}\)

**Pharmacological interventions**

Fourteen studies examining pharmacological interventions were included in the review,\(^\text{60-73}\) most studies evaluating drugs which aim to reduce energy intake, in particular the selective serotonin agonist dexfenfluramine. Pooling the results of four randomised placebo controlled trials (including a 24 site multicentre randomised controlled trial)\(^\text{60}\) shows a significantly greater reduction in weight loss at one year in those receiving dexfenfluramine (−2.6 kg, 95% confidence interval (95% CI) −3.8 to −1.3).\(^\text{60-65}\) However, a three group randomised controlled trial found no significant difference between a group receiving dexfenfluramine (15 mg twice a day for three months) combined with one year of nutritionist consultation, and groups receiving nutritionist consultations alone (either at home or in a clinic) and behavioural treatment.\(^\text{72}\)

The combination of fenfluramine (a variant of dexfenfluramine) and a sympathomimetic drug (phentermine) has only been evaluated in placebo controlled trials of short duration.\(^\text{69, 72}\)

Side effects, such as gastrointestinal disturbances, have been found in those taking centrally acting appetite suppressants; however, 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 more than three months.\(^\text{113}\) However, the absolute risk is still very low.\(^\text{110}\) The availability of appetite suppressants has led to a “drug frenzy” in the United States.\(^\text{110}\) It is important that antiobesity medication is used cautiously in carefully selected obese patients, and only as an adjunct to diet and lifestyle management.\(^\text{1, 110}\)

Two new drugs in this area, sibutramine and orlistat, are presently under study. Sibutramine is a serotonin and noradrenergic reuptake inhibitor, whereas orlistat works by reducing the absorption of dietary fat through the inhibition of triglyceride hydrolysis. A multicentre double blind randomised controlled trial of sibutramine showed weight loss during the first six months, with weight remaining stable for the next six months but with only around 1.5–2.5 kg extra weight loss compared with placebo at 12 months.\(^\text{77}\)

**Surgical interventions**

Surgical treatment is normally considered only in people with morbid obesity (body mass index >40) because it is associated with a higher risk of premature death and when less
invasive methods of weight loss have failed.114-116

Fifteen studies of surgery met the inclusion criteria, examining gastric bypass, gastroplasty, jejunoileal bypass, gastrogastronomy, and the gastric balloon.14-54 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, arising as long as 10 or 15 years after surgery, and is no longer recommended. Six out of the seven randomised controlled trials showed gastric bypass to result in low early postoperative mortality and more weight loss one year postoperatively (about 45-65 kg) than gastroplasty (about 30-35 kg).75 76 78 79 83 85 86

In general the weight loss associated with surgical interventions is greater and more sustained than that achieved by non-surgical methods. Surgery for obesity, however, is associated with complications and morbidity—such as revision of the initial surgery, vitamin and mineral deficiencies due to the modification in gut absorption processes, associated mortality, feeling of fullness, dizziness, and a desire to lie down after eating (dumping syndrome), and faintness, nausea, and vomiting. Due to the complexity of the techniques used only surgical teams which can show experience and a good record (using data from long term follow up) should be allowed to conduct this type of surgery. A large non-randomised matched controlled trial is being undertaken in Sweden that will compare the effect of different surgical and non-surgical interventions on long term weight loss, comorbidity, quality of life, and costs.117

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.

Ten trials were identified that specifically evaluated interventions to maintain weight loss. Seven of these were concerned with behavioural programmes, mainly looking at continued contact.80-85 The evidence from these trials is conflicting.

One of these studies found that a combination of maintenance interventions led to a significantly greater amount of sustained weight loss when compared with a no maintenance control (table).44 Another showed that adding self help peer groups to therapist led maintenance programmes improved maintenance over a 21 month period (table).85 More people maintained initial weight loss when participating in a weight focus group (32%), compared with skills focus training (14%), and no treatment (18%) (table).39

Only one study investigated the role of pharmacological interventions in the maintenance of weight loss.71 The drug, sertraline (a selective serotonin reuptake inhibitor), did no better than placebo in terms of weight loss or fat free mass, when given alongside relapse prevention training for a period of 54 weeks.

Combined treatment and maintenance programmes were evaluated in 11 trials.98-108 The combination of behavioural treatment, relapse prevention training, and continued therapist contact by post and telephone was shown to be one of the most effective with patients maintaining their original weight loss (10 kg) throughout the 12 month maintenance period (table).100

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).104 108

Conclusions

Primary healthcare teams need to be more active in developing coordinated programmes of identification and active long term management of high risk and overweight people.

Several preventive and treatment strategies have been shown to be effective in reducing levels of obesity. Progression of obesity in high risk children may be prevented by family treatment and in adults by community based education linked with financial incentives. Interventions to reduce sedentary behaviour in children can also reduce overweight.

Behavioural, dietary, exercise, and drug treatments have all been shown to be effective to some extent in treating adult obesity, especially when used in combination. Because most people begin to regain weight lost a few months after treatment, longer follow up and use of maintenance strategies (such as self help groups) should be an integral part of any weight loss programme. Surgery may have a role in the treatment of morbidly obese people.

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