

Randomised controlled trial of four commercial weight loss programmes in the UK: initial findings from the BBC “diet trials”

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Abstract

Objective To compare the effectiveness of four commercial weight loss diets available to adults in the United Kingdom.

Design Six month multicentre randomised unblinded controlled trial.

Setting Community based sample of otherwise healthy overweight and obese adults.

Interventions Dr Atkins’ new diet revolution, Slim-Fast plan, Weight Watchers pure points programme, and Rosemary Conley’s eat yourself slim diet and fitness plan.

Main outcome measures Weight and body fat changes over six months.

Results All diets resulted in significant loss of body fat and weight over six months. Groups did not differ significantly but loss of body fat and weight was greater in all groups compared with the control group. In an intention to treat analysis, average weight loss was 5.9 kg and average fat loss was 4.4 kg over six months. The Atkins diet resulted in significantly higher weight loss during the first four weeks, but by the end was no more or less effective than the other diets.

Conclusions Clinically useful weight loss and fat loss can be achieved in adults who are motivated to follow commercial diets for a substantial period. Given the limited resources for weight management in the NHS, healthcare practitioners should discuss with their patients programmes known to be effective.

Trial registration Clinical trials NCT00327821.

Introduction

The prevalence of obesity and its comorbidities is increasing in the United Kingdom.¹ Over half of British adults are now overweight, and half of these people will probably become obese.² The estimated cost of obesity is £0.5bn (€0.7bn; \$0.9bn) each year to the NHS and £2bn each year to the wider economy.³

Most adults in the United States diet at some time, and trends in the UK are similar.⁴⁻⁶ Long term success rates tend to be poor, with 50% of weight loss being regained within one year.⁷

With a market estimated to be worth £11.2bn by 2007, it is not surprising that the commercial sector has shown a keen interest in weight loss programmes. Weight Watchers, the market leader, claims to have one million members (P Hunt, personal communication, 2005). Self help books that provide weight loss strategies are often best sellers—*Dr Atkins’ New Diet Revolution* has sold more than 10 million copies.⁸ Although commercial diets provide consumers with a plethora of choice, data on their comparative efficacy are limited.⁹

Our study compared four popular commercial weight loss programmes with a control group. The diets—representative of the main approaches to weight management in the UK today—were the Slim-Fast plan (a meal replacement approach), Weight Watchers pure points programme (an energy controlled diet with weekly group meetings), Dr Atkins’ new diet revolution (a self monitored low carbohydrate eating plan), and Rosemary Conley’s eat yourself slim diet and fitness plan (a low fat diet and a weekly group exercise class). We report the changes in weight and body fat over the six month study and describe dieting behaviour and weight change in the participants at 12 months.

Methods

The trial was an unblinded randomised controlled parallel dietary intervention study with a delayed treatment control group conducted at five regional centres (Surrey University, Bristol University, Nottingham University, Ulster (Coleraine) University, and Queen Margaret University College, Edinburgh).

Recruitment strategy

We identified potential participants via a BBC advertising campaign (television and other forms of media). Participants were chosen from people who lived within 30 miles of a test centre, were aged between 18 and 65, and had a self reported body mass index between 27 and 40. Volunteers who fulfilled these preliminary inclusion criteria contacted their general practitioner for confirmation that they were eligible. Exclusion criteria were coronary heart disease; type 1 or type 2 diabetes; renal, liver, or respiratory failure; gout; obesity with known cause (Cushing’s disease, hypothyroidism); previous gastric or weight loss surgery; clinical depression; eating disorders; drug or alcohol misuse; any malabsorptive state (including lactose intolerance); taking lipid lowering or anti-hypertensive drugs; taking any drugs (including orlistat and sibutramine) for weight loss; being treated for cancer; and being pregnant or breastfeeding. Participants gave full informed consent. Three hundred people returned the necessary documentation to enter baseline testing by the start date of the study (July 2002).

Protocol assignment

We estimated that 60 initial participants (44 completers) were needed per treatment group (allowing for a 25% dropout rate) for an 80% chance of identifying a true difference of 4 kg of body weight loss (3 kg body fat), with a significance level of 5%. Thus, each of the five test centres aimed to recruit 60 participants (12 for each diet group; total sample size of 300). Participants took all baseline tests before randomisation and each centre started the

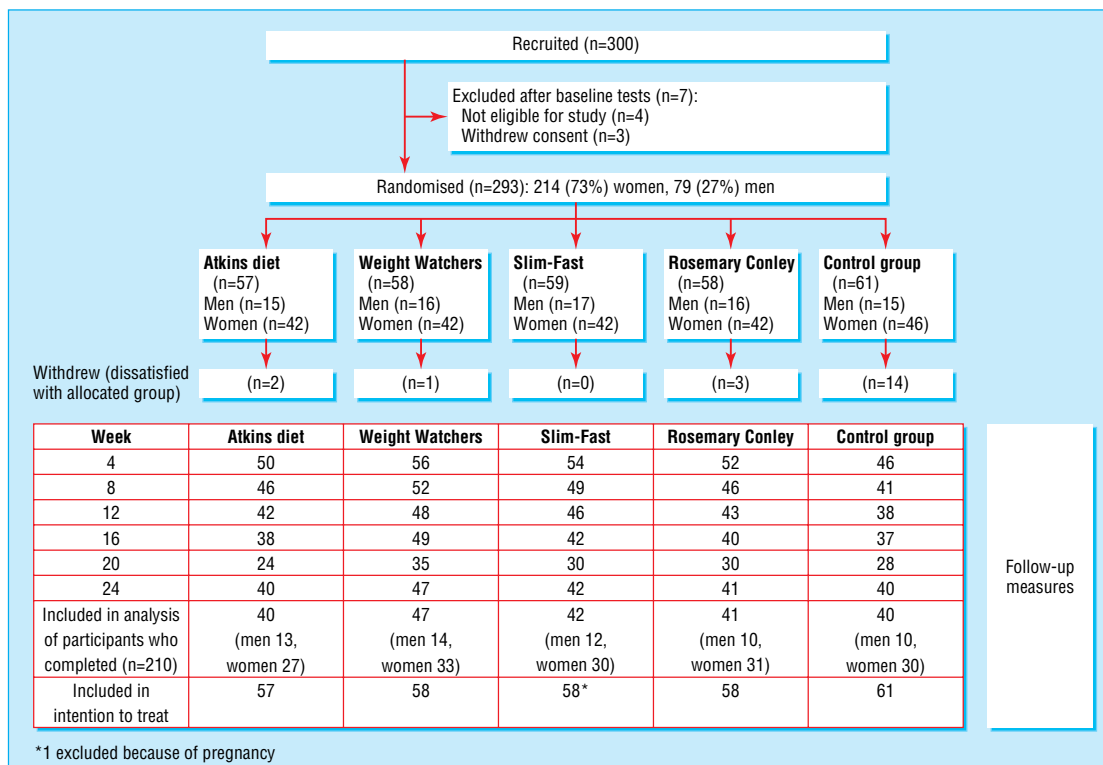


Fig 1 Flow of participants through the BBC diet trials

study within six weeks of the start date. Seven participants were subsequently excluded (fig 1). At each test centre, we stratified participants by sex and allocated them to a group using random number generation. Body mass index and age did not differ between groups or between centres.

It was not possible to blind the participants to the diet regimen and we did not attempt to blind the investigators during the study or data analysis.

Providing dietary programmes to participants

For the group based programmes (Weight Watchers and Rosemary Conley), participants attended the most convenient class and we reimbursed the costs of joining and attending one class each week. Both parent companies signed a contract committing to the provision of standard care. For Slim-Fast, we reimbursed the cost of up to two meal replacements each day and provided a copy of the Slim-Fast support pack. We gave participants in the Atkins group a copy of *Dr Atkins' New Diet Revolution*.⁸ We asked the members of the control group to maintain their current diet and exercise pattern and offered them any of the diets for six months at the end of study (free of charge). All participants could claim reimbursement of travel costs.

Study protocol and monitoring

Measures at baseline, two months, and six months included weight, height, waist circumference, blood pressure, and fasting blood and body fat by whole body dual x ray absorptiometry. We excluded the absorptiometry data of four participants from all analyses because of errors at baseline. Monthly test centre measurements recorded weight in light clothing, blood pressure, and waist circumference. We monitored renal function in the Atkins group by urea, electrolytes, and cystatin C, and these measures remained within the reference ranges.¹⁰ Participants completed a seven day diet and activity diary at baseline, eight weeks, and 24

weeks. We gave no dietary or exercise advice so as not to compromise the study. When we analysed the food diaries at two months we found that some of the participants on the Atkins diet were not taking supplements of micronutrients as advised in the book. Therefore, from week 10 we offered free daily supplements of multivitamins. All participants who withdrew completed a short exit questionnaire. At 12 months, we recorded the weight and dieting behaviour from six to 12 months of all participants still willing to attend test centres.

Statistical analysis

The primary analysis was on an intention to treat basis, with baseline values carried forward to replace missing values (one participant was not used in this analysis as she withdrew because of pregnancy). A secondary analysis focused on the outcomes of these dietary approaches in the most motivated subjects who provided complete data (baseline, two months, and six months). Analysis of variance showed that the test centre did not affect total weight loss in participants who completed. Attrition rates did not differ between centres, so we analysed data from all participants together. Baseline weight correlated with total weight loss ($r=0.33, P<0.001$) and was therefore used as a covariate in the analysis of weight loss over time, which uses repeated measures analysis of covariance. In the intention to treat analysis, we used ANOVA to examine differences between groups; where ANOVA indicated a significant group effect, we performed post hoc pairwise testing with Tukey's HSD (honestly significantly different) test. Before parametric testing, we assessed homogeneity of variance with Levene's statistic and tested for normal distribution; we used Welch's F statistic if variance of the dependent variable was not equal across groups. We analysed differences between participants who completed and withdrew with *t* tests for continuous variables (such as age) and χ^2 for categorical variables (such as sex and diet group).

Table 1 Mean baseline characteristics of participants in the BBC diet trials allocated to different diet regimens. Values are mean (SD)

Characteristic	Atkins diet (n=57)	Weight Watchers (n=58)	Slim-Fast (n=59)	Rosemary Conley (n=58)	Controls (n=61)
Age (years)	40.9 (9.7)	39.9 (10.9)	38.9 (10.7)	40.6 (10.3)	40.8 (9.6)
Weight (kg)	90.3 (12.7)	88.8 (13.3)	90.1 (14.1)	89.8 (12.9)	87.9 (13.5)
Body mass index (kg/m ²)	31.9 (2.2)	31.2 (2.7)	32.2 (3.0)	31.6 (2.6)	31.5 (2.9)
Body fat (kg)*	35.7 (6.0)	34.2 (6.9)	35.6 (6.5)	34.5 (7.6)	33.4 (6.5)
Body fat (%)	40.9 (6.6)	39.7 (7.1)	40.6 (6.5)	39.6 (7.7)	39.4 (6.8)
Waist circumference (cm)	102 (10.6)	100 (10.3)	101 (11.5)	100 (9.8)	100 (10.1)
Blood pressure (mm Hg):					
Systolic	135 (15.1)	127 (15.1)	129 (17)	130 (14.8)	130 (16.1)
Diastolic	83 (10.7)	80 (10.7)	81 (11.5)	82 (10.3)	81 (9.6)
Glucose (mmol/l)†	5.47 (0.5)	5.46 (0.5)	5.53 (0.6)	5.6 (0.6)	5.48 (0.5)
Total cholesterol (mmol/l)†	5.77 (0.9)	5.58 (1.1)	5.47 (1.1)	5.63 (0.95)	5.80 (1.1)

*Not measured in all participants: 57 for Weight Watchers, 56 for Rosemary Conley, 60 for controls.

†Not measured in all participants: 56 for Atkins diet, 57 for Rosemary Conley, 59 for controls.

Results

Table 1 shows the baseline demographics and anthropometric measures. The mean time spent on the diet was 24.3 (SD 1.56) weeks and did not differ between diet groups ($F=2.0$, $P=0.12$).

Weight and fat loss

Monthly weight loss by using all available data (fig 2) was high initially but then slowed. Mean weight loss was significantly

higher in the Atkins group than in the other diet groups during the first four weeks ($F=6.9$, $df=3$, $P<0.001$): Atkins 4.4 kg (SD 2.45, range 13.5 to 0.3 kg), Weight Watchers 2.86 kg (2.23, 12.9 to -0.9 kg), Slim-Fast 2.68 kg (2.33, 9.4 to -1.8 kg), and Rosemary Conley 3.17 kg (2.02, 8.1 to -2.0 kg). At other time points, mean weight loss did not vary significantly between the diet groups (table 2).

Loss of body fat showed similar patterns (table 2). In the first two months, the greatest loss of body fat was seen in the Atkins group; this loss was not significantly different from that seen in the Weight Watchers or Rosemary Conley groups, but it was significantly greater than that seen in the Slim-Fast group. Fat loss was significantly greater in all four diet groups than in the control group. Between two and six months, fat loss (kg and percentage) slowed down, and the diets groups did not differ significantly. Between baseline and six months fat loss did not differ between diet groups, but fat loss in all diet groups was significantly greater than in the control group. All diets resulted in a reduction in waist circumference. Waist reduction (at six months) was highly correlated with total weight loss ($r=0.81$, $P<0.001$) and moderately correlated with percentage of body fat lost ($r=0.64$, $P<0.001$).

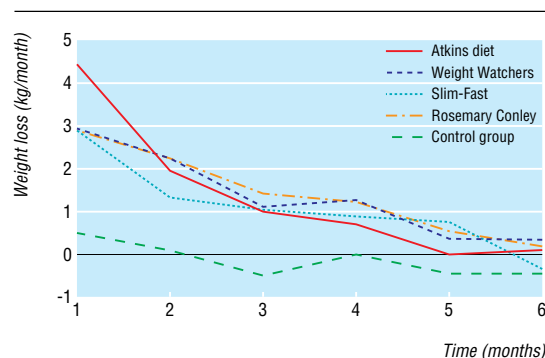


Fig 2 Weight loss during the BBC diet trials

Table 2 Intention to treat analysis of main outcome indicators in participants in the BBC diet trials allocated to different diet regimens

Outcome	Atkins diet (n=57)	Weight Watchers (n=58)	Slim-Fast (n=58)	Rosemary Conley (n=58)	Controls (n=61)
Weight loss (kg)					
0-2 months	5.2 (4.4)	4.7 (3.2)	3.7 (3.5)	4.0 (3.3)	0.4 (1.8)
2-6 months	1.3 (3.1)	2.2 (3.0)	1.4 (2.8)	2.4 (3.4)	-0.9 (1.6)
0-6 months	6.0 (6.4)	6.6 (5.4)	4.8 (5.6)	6.3 (6.1)	-0.6 (2.2)
Weight loss (%)					
0-2 months	5.5 (4.2)	5.1(3.5)	3.8 (3.4)	4.5 (3.6)	0.4 (2.2)
2-6 months	1.3 (3.1)	2.4 (3.4)	1.3 (2.9)	2.7 (3.7)	-1.2 (1.9)
0-6 months	6.2 (6.2)	7.3 (6.1)	4.9 (5.5)	7.0 (6.6)	-0.6 (2.7)
Fat loss (kg)*					
0-2 months	3.5† (3.0)	3.1 (2.4)	2.3† (2.3)	2.5 (2.1)	0.2 (1.3)
2-6 months	1.2 (2.3)	2.0 (2.3)	1.2 (2.6)	2.1 (2.5)	-0.5 (1.2)
0-6 months	4.6 (4.8)	5.0 (4.3)	3.4 (4.3)	4.5 (4.3)	-0.3 (4.4)
Fat loss (%)					
0-2 months	1.9† (1.9)	1.6 (1.9)	1.0† (1.4)	1.5 (1.5)	0.1 (1.4)
2-6 months	1.3 (1.9)	2.0 (2.0)	1.2 (2.4)	2.1 (2.4)	-0.0 (1.0)
0-6 months	3.1 (3.3)	3.6 (3.3)	2.1 (2.9)	3.4 (3.5)	0.1 (1.6)
Reduction in waist circumference (cm)					
0-2 months	6.7 (6.1)	5.5 (5.1)	4.8 (4.6)	4.5 (5.3)	1.0 (4.0)
2-6 months	2.4 (4.0)	3.0 (3.5)	2.1 (3.4)	3.0 (4.2)	-0.3 (2.4)
0-6 months	8.1 (7.4)	8.3 (7.0)	6.4 (6.3)	7.2 (7.2)	0.8 (3.8)

For all variables reported, the control group was significantly different from all other groups ($P<0.001$).

*Not measured in all participants: 57 for Weight Watchers, 56 for Rosemary Conley, 60 for controls.

†Pairwise comparison of group means with post hoc Tukey's HSD (honestly significantly different) test found a significant difference between the Atkins and Slim-Fast groups.

Table 3 Intention to treat analysis of changes in cardiac risk factors in participants in the BBC diet trials allocated to different diet regimens. Values are mean (SD)

Outcome	Atkins diet (n=57)	Weight Watchers (n=58)	Slim-Fast (n=58)	Rosemary Conley (n=58)	Controls (n=61)	P value (ANOVA)
Fall in blood pressure						
0-2 months:						
Systolic	5.7* (12.7)	3.5 (9.6)	0.5* (11.4)	2.4 (11.2)	3.3 (11.0)	0.05
Diastolic	3.6 (8.4)	4.1 (6.8)	3.1 (7.8)	2.8 (7.1)	2.0 (7.0)	0.61
2-6 months:						
Systolic	1.3 (9.8)	0.9 (10.3)	2.9 (12.4)	2.1 (9.2)	-0.9 (8.3)	0.23
Diastolic	1.1 (6.3)	0.8 (6.7)	-0.3 (8.6)	1.0 (5.5)	-0.4 (5.7)	0.51
0-6 months:						
Systolic	7.2 (11.6)	4.1 (11.7)	2.7 (10.7)	4.5 (9.8)	2.8 (11.8)	0.19
Diastolic	4.9 (8.1)	4.4 (8.6)	2.5 (8.6)	3.6 (6.0)	1.6 (7.4)	0.13
Fall in total glucose (mmol/l)						
0-2 months	0.04 (0.4)	0.14 (0.5)	0.13 (0.5)	0.15 (0.5)	0.02 (0.4)	0.44
2-6 months	0.13 (0.5)	0.29 (0.6)	0.12 (0.5)	0.17 (0.5)	0.13 (0.4)	0.34
0-6 months	0.19 (0.5)	0.46* (0.6)	0.19 (0.6)	0.27 (0.5)	0.14* (0.5)	0.013
Fall in cholesterol (mmol/l)						
0-2 months	0.08 (0.7)	0.44* (0.6)	0.26* (0.6)	0.35* (0.8)	0.08 (0.5)	0.001
2-6 months	0.19 (0.5)	0.11 (0.5)	0.07 (0.5)	0.08 (0.6)	0.24 (0.24)	0.24
0-6 months	0.29 (0.8)	0.55* (0.7)	0.35 (0.6)	0.5 (0.5)	0.5* (0.18)	0.013

*Pairwise comparison of group means using post hoc Tukey's HSD (honestly significantly different) test showed a significant difference in systolic blood pressure at 2 months between the Atkins and Slim-Fast groups; in the fall in glucose at 6 months between the control and Weight Watchers groups; in the fall in total cholesterol at 2 months between the Weight Watchers, Rosemary Conley, and Slim-Fast groups; and in the fall in total cholesterol at 6 months between the Weight Watchers and control groups.

Cardiac risk factors

We found few significant differences in cardiac risk factors between the diets groups and the control group (table 3). Initially, the fall in systolic pressure in the Atkins group was significantly greater than in the Slim-Fast group but not the other groups, probably because of the relatively greater initial weight loss in the Atkins group. Regression analysis showed that total weight loss over time had the greatest influence on systolic and diastolic pressure (adjusted R^2 0.61 for change in systolic pressure and 0.79 for change in diastolic pressure).

Glucose concentrations fell slightly over time; only in the Weight Watchers group was fasting glucose significantly lower than in the control group. In the first two months, a significant but small drop in total cholesterol was seen in all diet groups except for the Atkins group. By six months, cholesterol had fallen significantly compared with the control group only in the Weight Watchers group (by 0.55 mmol/l).

Analysis of completers

A secondary analysis of data from participants who completed the trial shows the range of weight lost by these highly motivated participants, who probably adhered most strongly to the randomly allocated diets. Figure 3 shows the range of total weight lost; some participants lost more than 25 kg over the six month study period, whereas others gained weight (fig 3).

After six months all diets resulted in a clinically useful mean reduction in percentage body weight: Rosemary Conley 9.9% (SD 5.6%), Weight Watchers 9.0% (5.6%), Atkins 8.9% (5.6%), and Slim-Fast 6.8% (5.3%); no significant differences were seen between the diets but all were more successful than no diet (controls gained 0.95%, 3.3%). The proportion of participants who completed the trial and lost at least 10% of their body weight at six months was 46% for the Rosemary Conley group, 45% for the Atkins group, 36% for the Weight Watchers group, and 21% for the Slim-Fast group. These losses were achieved despite the random allocation of diets.

Compliance with the diets

Reported attendance at slimming clubs was similar at two months (Rosemary Conley 79%, Weight Watchers 66%) and six

months (47%, 47%). Slim-Fast recommends 14 meal replacements each week; participants reported 10 each week at two months and eight at six months. With the Atkins diet, reported portions of carbohydrate foods fell from 40 each day at baseline to five at two months and seven at six months.

Withdrawal

Eighty three (28%) participants had withdrawn by six months (table 4); 53 (64% of the total number) had withdrawn by week 8, and at this time only seven (8%) participants who withdrew had lost more than 5% of their body weight compared with 53 (25%) who completed the trial. Older participants were significantly more likely to complete than younger ones (mean age 41.6 (9.9) v 36.8 (10.4); $t = -3.7$, $P < 0.001$; 95% confidence interval 2.3 to 7.4). No differences in diet, centre, or sex were found between participants who completed or withdrew. Withdrawal in the control group (21; 35%) was mostly because participants did not wish to delay dieting.

Follow-up at 12 months

At 12 months, 158 participants (54% of the original sample) returned data; 29 had originally been allocated to the Atkins diet, 33 to Weight Watchers, 33 to Slim-Fast, 35 to Rosemary Conley,

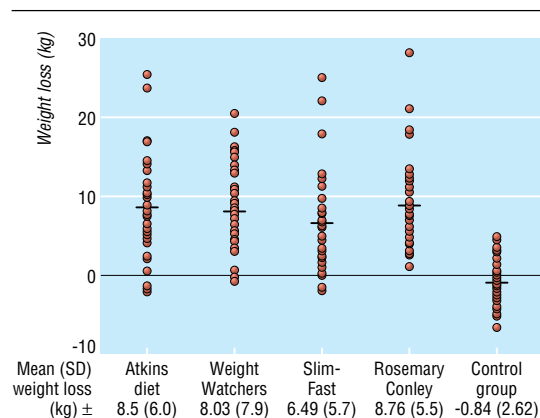


Fig 3 Absolute weight loss of participants who completed the BBC diet trials

Table 4 Reasons for withdrawal from the diet

Group	Dissatisfied with randomisation		Could not tolerate diet		Dissatisfied with weight loss		Non-compliant or lost to follow-up		Socioeconomic		Pregnancy		Total (% of initial cohort)	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Atkins diet	0	2	1	6	0	0	0	2	1	5	—	0	2 (13)	15 (36)
Weight Watchers	0	1	0	2	0	1	2	4	0	1	—	0	2 (13)	9 (21)
Slim-Fast	0	0	1	6	0	3	4	1	0	1	—	1	5 (29)	12 (29)
Rosemary Conley	2	1	0	1	1	2	1	3	2	4	—	0	6 (40)	11 (26)
Controls	2	12	—	—	—	—	2	1	1	3	—	0	5 (33)	16 (35)
Total	4	16	2	15	1	6	9	11	4	14	—	1	20 (25)	63 (29)

M=male, F=female.

and 28 to the control group. Dieting behaviour had changed considerably: only 58 (45%) were still keeping to their originally allocated diets (nine to Atkins, 20 to Weight Watchers, nine to Slim-Fast, 20 to Rosemary Conley). Twenty five (19%) had swapped dietary programmes and 47 (36%) were following their own diet or exercise plan. More participants in the unsupported programmes (Atkins diet and Slim-Fast) withdrew than in the supported programmes ($\chi^2=8.34$, $df=3.0$, $P=0.04$). Participants in the control group who had switched to dieting (mean weight loss 6.37, SD 4.5 kg) also preferred group based approaches because just over half chose Weight Watchers.

Because so many participants changed diets (25% of men and 29% of women), we also analysed weight loss in participants who had maintained the diet to which they were initially allocated (table 5). Statistical analysis is limited by sample size but indicates that weight rebound after the initial six months was higher in the unsupported programmes; however, all diets resulted in a clinically useful weight loss of around 10% after 12 months in participants who had persisted with the diet allocated.

Discussion

Clinically beneficial weight loss is possible through commercially available strategies, and reduced blood pressure and waist circumference accompany weight loss. The four different approaches were equally effective after six months. Reductions in weight and body fat were seen with the Atkins diet within the first eight weeks of dieting, so that the large weight changes seen with low carbohydrate diets are not caused by loss of body water alone. The Atkins diet had no detrimental effects on total cholesterol concentrations or renal function, although the overall safety of the diet was not tested.¹¹

The range of absolute weight loss in participants who completed the study was wide. Importantly, we did not try to standardise energy intake across the groups, so that the effects reflect the participants' interpretation of and compliance with the diet allocated. However, the mean absolute weight loss of around 8 kg is comparable to other studies.^{12 13} Compliance with each diet varied greatly. Weight can be lost only by a sustained negative balance of energy, so the degree of adherence to a diet will predict success or failure if activity levels remain constant. More information is needed to enable health professionals to

decide which dietary approach may suit their patients. Currently, we cannot predict the dietary approach best suited to each person to lose weight and maintain weight loss in the longer term, but it is clear that "one size does not fit all."

Our study was used to make the BBC series on diet trials, which featured a small number of people. Since motivation to meet goal weights and patients' expectations of weight loss are key determinants of success,¹⁴ participants may have been influenced by the media interest. Overall, around 5% of participants were featured in the television programmes, and most participants knew that they would not be filmed within the first few weeks. Excluding data from the 15 filmed participants had no effect on the overall statistical outcomes shown in this study. The withdrawal rate was comparable to other longitudinal studies of weight loss.^{15–17}

No dietary differences were apparent at six months, but behaviour from six to 12 months points towards an advantage of programmes based on group support. The need for a "quick fix" and the relative lack of interest that people show in achieving modest weight loss contribute to lack of adherence to most diets in the long term. People who had kept to their allocated diet lost about 10% of their weight, despite some weight rebound, but some regression to the mean effect was seen. These results provide information on the "best effect" that the most highly motivated subjects may hope to achieve over one year.

In conclusion, commercial weight loss programmes can help people with uncomplicated obesity. Our study provides data on how much weight patients can expect to lose by dieting, and these data could help practitioners in managing patients' sometimes unrealistic expectations of weight loss targets. The benefits to health of modest weight loss and maintaining that loss over long periods need to be emphasised.

Contributors: HT was the principal investigator and is guarantor. She contributed to the study design, data analysis, interpretation, drafting, and writing of the paper. DJM and LMM contributed to the study design, data analysis, interpretation, drafting, and writing of the paper. KRF contributed to the study design, interpretation, reporting, and critical review of paper. SB contributed to study execution, data collection, and critical review of the paper. IAM, MAT, MBEL, CML, and AdEL contributed to the study planning, interpretation, reporting, and critical review of the paper. Thanks to David Lovell for statistical advice; Manana Stanley, Rebecca Hiscutt, and Anne Herriot for planning, study execution, and data collection; Monique Raats and Richard Shepherd for study planning; Kathryn Hart, Rachel Bar-

Table 5 Mean (SD) weight loss for participants in the BBC diet trials who completed 12 months on the diet to which they were randomly allocated

Weight loss	Atkins diet (n=9)	Weight watchers (n=20)	Slim-Fast (n=9)	Rosemary Conley (n=20)	P value*
0-12 months:					
Absolute weight loss (kg)	9.0 (4.1)	9.1 (6.2)	10.7 (6.2)	10.9 (4.1)	0.61
Weight loss (% of initial body weight)	10.3 (4.7)	10.3 (6.0)	11.4 (5.9)	13.1 (4.9)	0.38
6-12 months:					
Absolute weight loss (kg)	-1.5 (3.3)	0.45 (3.6)	-1.65 (3.1)	1.2 (3.5)	0.11

*Comparison of active diets.

ratt, Karen Sargent, Sarah Jones, Julie Littlewood, Sujata Dissanayake, Elizabeth Simpson, and Michelle Hazell for data collection; Mark Davis for study design and data collection; Katherine Collings for planning, study execution, and data collection; Paula J Robson, Julie MW Wallace, Maxine P Bonham, and Laura Nichol for study execution and data collection; Susan Jebb for study design; and Kirsten Rennie for sample size determination.

Competing interests: KRF receives consulting fees for serving on the scientific advisory panel of Slimming World, a company that offers a support service for weight loss. This company was not involved in this trial but as it is similar to Rosemary Conley and Weight Watchers, the conclusions may have implications for the company.

Funding: The study was sponsored by the BBC. The BBC had no role in the study design; collection, analysis, or interpretation of data; or report writing. Ethical approval: South East multicentre research ethics committee, approval number MREC 01/01/44. Local ethics committee approval was also obtained at each centre.

- 1 Department of Health. *White paper on public health. Saving lives: our healthier nation*. London: Stationery Office, 1999.
- 2 Royal College of Physicians. *Storing up problems: the medical case for a slimmer nation*. London: RCP, 2004.
- 3 Vlad I. Obesity costs UK economy £2bn a year. *BMJ* 2003;327:1308.
- 4 French SA, Jeffery RW, Murray D. Is dieting good for you? Prevalence, duration and associated weight and behaviour changes for specific weight loss strategies over four years in US adults. *Int J Obes Relat Metab Disord* 1999;23:320-7.
- 5 Offer A. Body weight and self control in the United States and Britain since the 1950s. *Soc Hist Med* 2001;14:79-106.

- 6 Serdula MK, Mokdad AH, Williamson DF, Galuska DA, Mendelin JM, Heath GW. Prevalence of attempting weight loss and strategies for controlling weight. *JAMA* 1999;282:1353-8.
- 7 Perri MG. The maintenance of treatment effects in the long term management of obesity. *Clin Psychol Sci Pract* 1998;5:526-43.
- 8 Atkins R. *Dr Atkins' new diet revolution*. South Dakota: Vermillion, 1999.
- 9 Freedman M, King J, Kennedy E. Popular diets: a scientific review. *Obes Res* 2001;9(suppl 1):1-40.
- 10 Newman D, Cystatin C. *Ann Clin Biochem* 2002;39:89-104.
- 11 Crowe TC. Safety of low-carbohydrate diets. *Obes Rev* 2005;6:235-45.
- 12 Harvey-Berino J. The efficacy of dietary fat vs total energy restriction for weight loss. *Obes Res* 1998;6:202-7.
- 13 Karvetti RL, Halka P. A seven year follow up of a weight reduction programme in Finnish primary health care. *Eur J Clin Nutr* 1992;46:743-52.
- 14 Foster GD, Wadden TA, Vogt RA, Brewer G. What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *J Consult Clin Psychol* 1997;65:79-85.
- 15 Lean M, Han T, Prvan T, Richmond PR, Avenell A. Weight loss with high and low carbohydrate 1200 kcal diets in free living women. *Eur J Clin Nutr* 1997;51:243-8.
- 16 Stern L, Iqbal N, Seshadri P, Chicano KL, Daily DA, McGrory J, et al. The effects of low carbohydrate versus conventional weight loss diets in severely obese adults: one year follow-up of a randomized trial. *Ann Intern Med* 140:769-77.
- 17 Foster GD, Wyatt HR, Hill JO, McGuckin BG, Brill C, Mohammed BS, et al. A randomized trial of a low-carbohydrate diet for obesity. *N Engl J Med* 2003;348:2082-90.

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What is already known about this topic

The prevalence of obesity and overweight with its subsequent comorbidities is growing in the UK

Commercial diets are an increasingly popular option for weight management

What this study adds

The comparative efficacy of four commercial diets was similar

The health benefits associated with a modest loss of weight (5-10% body weight) can be gained by people following a range of dietary regimens for six months with little support from health professionals