# A primary care intervention programme for obesity and coronary heart disease risk factor reduction

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*SUMMARY*

***Background:*** *Obesity is a growing problem, with its associated morbidity, mortality, and economic costs. Treatment options and the availability of resources are limited and inconsistent.*

***Aim:*** *To implement and evaluate a primary care dietitian-run weight management programme.*

***Design of study:*** *Pilot intervention study.*

***Setting:*** *Three health centres in the north locality of Nottingham City Primary Care Trust.*

***Method:*** *Two hundred and sixteen individuals, with a body mass index (BMI) >30 kg/m$^2$ and coronary heart disease risk factors, were recruited to attend education and support groups. Changes in BMI, waist circumference, percentage body fat, blood pressure, blood lipids, glycated haemoglobin ($HbA_{1c}$), and assessment of psychological wellbeing using the 'short form' (SF-36) general health questionnaire, were conducted at 0, 3, and 12 months.*

***Results:*** *One hundred and thirty patients completed the 3-month phase, and 75 completed the follow-up 9-month phase. Four per cent of patients entering the programme achieved a 10% weight loss, and 13% achieved a weight loss between 5 and 10%. Those continuing to attend achieved a mean weight loss of 2.9% (mean = 3.1 kg, ranging from a loss of 23.6 kg to a gain of 3.8 kg, P<0.001) at 3 months, which was maintained at 12 months. Waist circumference, percentage body fat, systolic blood pressure, total cholesterol, $HbA_{1c}$ (in those with diabetes) (P<0.001), and triglycerides (P = 0.004) showed reduction. Psychological wellbeing improved in seven of the nine categories of the SF-36.*

***Conclusion:*** *Those who continued to attend the programme showed significant reduction in weight and other clinical parameters at 3 months, and this was maintained at 1 year with less intensive support. An attrition rate of approximately 66% by 12 months demonstrated that, in spite of intensive dietetic resources, patient retention and follow-up of progress was difficult.*

***Keywords:*** *diet; dietitians; health education; obesity; pilot study; weight loss.*

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## Introduction

THE prevalence of obesity has trebled over the past 20 years, and 17% of men and 21% of women in the United Kingdom (UK) are now obese.[1] Obesity causes substantial human, National Health Service (NHS) and economic costs.[2-3] The National Service Framework (NSF) for coronary heart disease[4] and the NSF delivery strategy for diabetes[5] emphasise the importance of tackling obesity. Improving diet and nutrition is a government priority, and local interventions to tackle obesity and physical inactivity were expected to be in place by 2004.[6] Many local initiatives are running across the UK, but no guidance is yet in place to ensure consistent and effective use of resources.

Treatment options for obesity are limited and inconsistent, and there is uncertainty about which interventions are effective.[1,7] Lifestyle advice, prescriptive diets, psychological techniques, pharmacological agents, and bariatric surgery are management options. Patients may receive advice in primary or secondary care on an individual basis or in group programmes. Most contact with overweight and obese people occurs in primary care, where health professionals feel guidance is required.[2] State registered dietitians (SRDs) are traditionally seen as the health professionals best equipped to advise patients on successful weight loss. They possess the expert nutritional knowledge, communication skills and understanding of energy balance required.[8] Dietetic resources are often limited, but SRDs are well equipped to provide training and support for other health professionals. Local strategies are needed to identify the best use of limited resources and the potential for additional funding.[9]

Health action zone funding (health action zones are partnerships between the NHS, local authorities, community groups, and the voluntary and business sectors) was obtained for a whole-time equivalent senior SRD to implement an intensive SRD-led group education approach in local health centres. Usual resources mean that patients referred to the community dietitian have only one appointment, with the dietitian having to refer back to primary care for follow-up and support.

## Method

### *Target participants*

The recruitment of patients is summarised in Figure 1. Adult patients between the ages of 18 and 65 years, with a body mass index (BMI) (weight [kg]/height [m]$^2$) above 30, and coronary heart disease risk factors such as hypertension, coronary heart disease, type 2 diabetes, or a family history of coronary heart disease, were recruited from primary care.

**HOW THIS FITS IN**

*What do we know?*

The need to tackle obesity and physical inactivity is identified as a government priority, and it is expected that local initiatives and strategies will be developed. Dietetic and medical resources for obesity management vary across the United Kingdom and many health professionals are unsure which treatments or strategies should be developed.

*What does this paper add?*

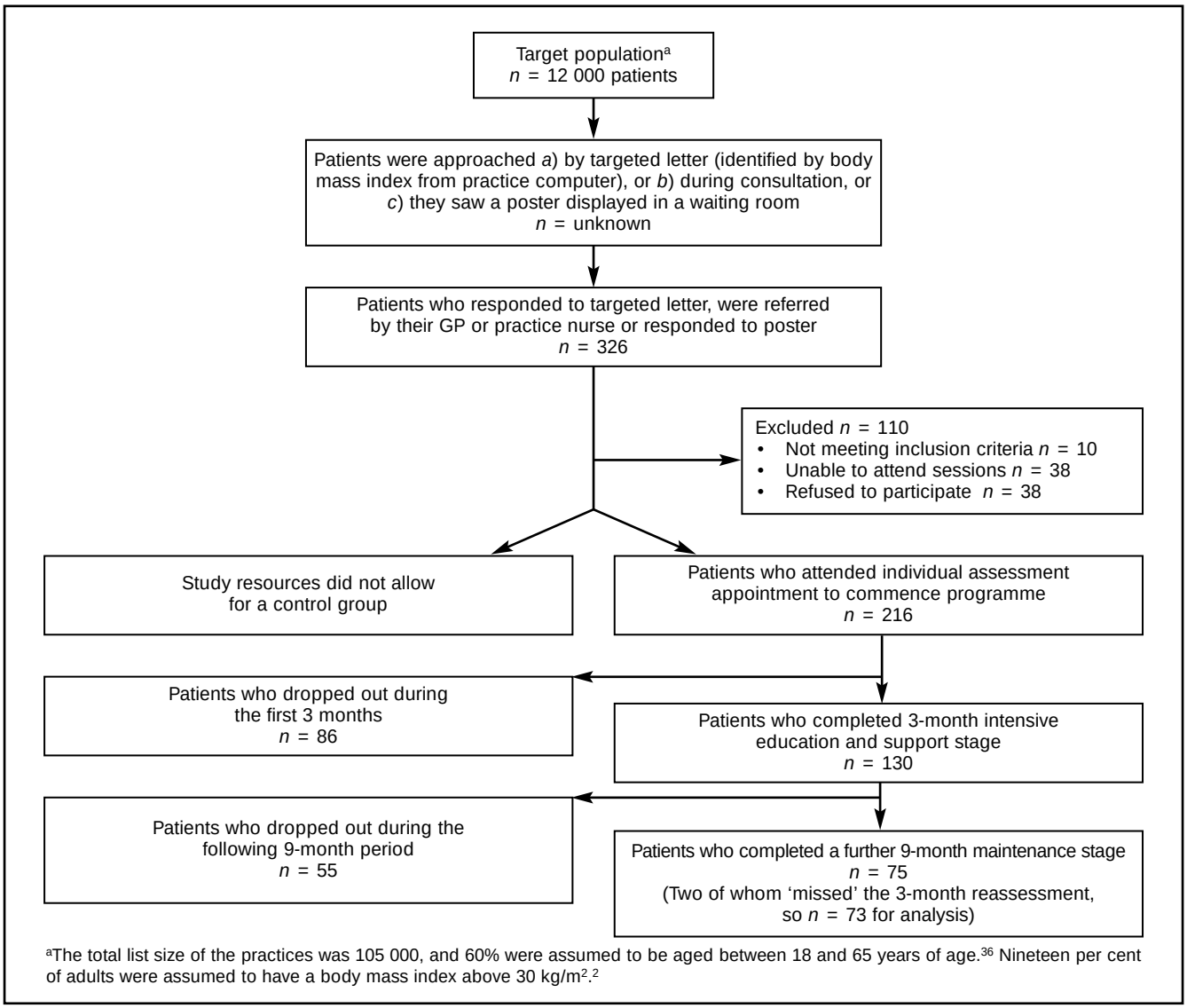
This paper reports on the implementation and evaluation of a new approach to weight management in primary care.

Information and recruitment packs were sent to the practices in the study area. General practitioners (GPs) and practice nurses could refer patients opportunistically or patients could refer themselves after reading posters advertising the project. Some practices identified eligible patients from computerised BMI data and sent them invitation letters to directly refer themselves. Exclusion criteria included: current use of obesity medication, insulin treatment of diabetes, pregnancy, and attendance at a hospital obesity clinic. Patients were recruited between October 2000 and July 2001, with groups running until July 2002.

## *Study methodology and outcome measures*

We obtained ethical approval from Queens Medical Centre Nottingham University Hospital NHS Trust Research Ethics Committee.

The dietitian telephoned referred patients to discuss the programme and invited them to an individual assessment appointment before commencing the group sessions. At the assessment appointment the 'short form' (SF-36) general health questionnaire was administered to assess psychological wellbeing.[10] Height was measured with a stadiometer, and weight and percentage body fat were measured using bioelectrical impedance scales. We calculated systolic blood




[a]The total list size of the practices was 105 000, and 60% were assumed to be aged between 18 and 65 years of age.[36] Nineteen per cent of adults were assumed to have a body mass index above 30 kg/m$^2$.[2]

*Figure 1. Recruitment and end points of patients into the programme.*

pressure and diastolic blood pressure from the mean of three consecutive measurements using the Omron 711 automatic electronic machine, and measured waist circumference (taken in a horizontal plane as the mid-point between the lowest rib and the iliac crest), with a tape measure, to the nearest millimetre.[11] A random blood sample was obtained for total cholesterol, low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), triglycerides, and glycated haemoglobin ($HbA_{1c}$). The dietitian took most of the measurements at each assessment session, with a nurse employed on a sessional basis to measure the blood pressure and to obtain the blood samples.

Seven 2-hour education and support group sessions were run by the dietitian at intervals of 2 weeks. Further 2-hour sessions were delivered at 4 months, 6 months, 9 months, and 12 months. Each session commenced with a confidential 'weigh in' and refreshments, followed by a topic presentation. A variety of teaching methods were used to encourage patient participation, and each session concluded with patients being guided in setting themselves personal aims. The topics covered in each session are outlined in Box 1. Each patient was given a personal folder for information handouts and progress sheets. All measurements and the SF-36 questionnaire were repeated at the end of the 3-month intensive stage and at the final 12-month session. Patients were given their test results after each assessment, and an education session was dedicated to explaining the tests and results. Recruitment, commencement, assessment and reassessment results, and any attrition, were communicated to the patient's GP by letter. Statistical analysis was conducted using Stata (Release 7.0) statistical software.

Patients' comments and views were sought throughout the programme, using anonymous questionnaires for patients who dropped out, and evaluation forms at the end of the programme, which were distributed with stamped addressed envelopes.

## Results

### *Characteristics of the study population*

Two hundred and sixteen patients attended an initial assessment, and their baseline clinical data are shown in Table 1.

### *Three-month changes in clinical parameters*

The 3-month data for the 60% of patients who continued to this stage are shown in Table 2. Those continuing to attend achieved a weight loss of 2.9% (mean = 3.1 kg, ranging from a loss of 23.6 kg to a gain of 3.8 kg, $P<0.001$) with a concomitant decrease in BMI ($P<0.001$). Reductions ($P<0.001$) were found in waist circumference, percentage body fat, total cholesterol, $HbA_{1c}$ (in those with diabetes), and triglycerides ($P = 0.004$).

### *Three- to 12-month changes in clinical parameters*

The clinical parameter results for the 73 patients who attended the 3-month reassessment and continued to 12 months are shown in Table 3. There were no significant changes in weight, BMI, waist circumference, percentage body fat, triglycerides, and $HbA_{1c}$ (in those with diabetes), showing that these 3-month improvements had been maintained. HDL and total cholesterol:HDL ratio showed significant improvement ($P<0.001$) during this sustained phase of lifestyle change. Systolic blood pressure showed a return to baseline ($P = 0.006$).

A 10% weight loss was achieved by 4% of patients who entered the programme, and 13% achieved a weight loss of between 5% and 10%.

### *Psychological wellbeing*

Table 4 shows the SF-36 parameter scores at assessment and 3 months. Seven of the nine parameters (physical function, mental health, energy and vitality, general health perception, change in health [$P<0.001$ for all of these parameters], social function [$P = 0.003$], and emotional role [$P = 0.007$]) assessed showed increases to identify improvements in these aspects of health. The SF-36 parameter scores at 3 months and 12 months did not show any significant deterioration from the gains achieved at 3 months.

### *Drop-out and patient evaluation*

Eighty-six (40%) patients did not complete the first 3 months of the programme and received a drop-out questionnaire. The most common responses given on the 27 (31%) questionnaires returned were: work commitments, childcare problems, family commitments, inconvenient timing of sessions, and preferring to lose weight on their own. None of those patients who returned the questionnaire reported that they did not think attending the group sessions would help them to lose weight.

| Session | Session content |
|---|---|
| Initial session | Introduction to the programme and an overview of healthy eating based on *The Balance of Good Health* publication[12] |
| 2 weeks | Physical activity, food and feelings |
| 4 weeks | Understanding and reducing dietary fat and explanation of clinical tests and results |
| 6 weeks | Sugary and starchy foods |
| 8 weeks | Protein foods, fruit and vegetables |
| 10 weeks | Alcohol, eating out and slimming aids |
| 12 weeks | Summary of information given and repeat assessments |
| 4 months | Salt in the diet, food labels and changing eating habits |
| 6 months | Cooking methods and recipe adaptation |
| 9 months | Focus on fat and sugar in foods |
| 12 months | Summary of programme and progress, final assessments and encouragement of continued progress |

*Box 1. Topics covered in each education and support session of the weight management programme.*

A further 55 (25%) patients did not complete the 9-month maintenance phase. Sixteen (29%) drop-out questionnaires were returned, the most common responses being: inconvenient timing of sessions, work commitments and childcare problems. These patients had lost significantly less ($P<0.001$) weight (mean = 1.7 kg, standard deviation [SD] = 3.0) at 3 months compared with the weight loss (mean = 4.1 kg, SD = 4.2) at 3 months of those who completed the programme.

Final evaluation forms were returned by 58 (77%) of the 75 patients who completed the programme. The responses were very favourable to the design and usefulness of the programme (Table 5). More patients rated themselves as

*Table 1. Baseline clinical data of patients attending assessment.*[a]

| | All patients *n* = 216 | Female patients *n* = 160 | Male patients *n* = 56 |
|---|---|---|---|
| Age in years at commencement of programme | 50.4 (12.4) | 48.2 (12.6) | 56.5 (9.2) |
| Weight in kg | 108.0 (20.0) | 106.4 (20.3) | 112.3 (18.6) |
| Range | 68.2–175.0 | 68.2–175.0 | 75.4–153.6 |
| BMI | 39.7 (6.9) | 40.7 (7.2) | 36.9 (5.2) |
| Waist measurement in cm | 120.1 (14.0) | 119.9 (14.7) | 120.1 (12.5) |
| Range | 91.4–160.0 | 91.4–160.0 | 96.5–144.8 |
| Percentage body fat | 45.4 (6.9) | 47.9 (4.3) | 38.3 (8.0) |
| Range | 23.2–64.0 | 37.6–60.1 | 23.2–64.0 |
| Systolic blood pressure in mmHg | 134 (20.7) | 130 (20) | 144 (19.1) |
| Range | 93–200 | 93–198 | 106–200 |
| Diastolic blood pressure in mmHg | 86 (10.7) | 85 (10.7) | 88 (11.3) |
| Range | 59–111 | 59–111 | 62–111 |
| Total cholesterol:HDL ratio | 4.4 (1.1) | 4.3 (1.0) | 4.5 (1.1) |
| Range | 1.9–7.4 | 1.9–7.4 | 2.2–7.0 |
| Total cholesterol in mmol/l | 5.3 (1.0) | 5.4 (1.0) | 4.9 (0.8) |
| Range | 2.5–8.4 | 3.0–8.4 | 2.5–7.1 |
| HDL in mmol/l | 1.3 (0.3) | 1.3 (0.3) | 1.2 (0.3) |
| Range | 0.7–2.2 | 0.8–2.2 | 0.7–2.2 |
| LDL in mmol/l | 3.0 (0.9) | 3.1 (0.9) | 2.7 (0.8) |
| Range | 0.9–6.2 | 1.0–6.2 | 0.9–4.3 |
| Triglycerides in mmol/l | 2.2 (1.0) | 2.1 (0.9) | 2.4 (2.4) |
| Range | 0.8–7.1 | 0.8–7.1 | 0.8–5.5 |
| $HbA_{1c}$ (%) in patients with diabetes (*n* = 54 [25%]) | 7.8 (1.5) | 7.9 (1.7) | 7.6 (1.1) |
| Range | 4.7–12.3 | 4.7–12.3 | 5.5–9.7 |
| Number with hypertension (%) | 123 (57) | 90 (56) | 33 (59) |
| Number with angina (%) | 22 (10) | 8 (5) | 14 (25) |
| Number with previous myocardial infarction (%) | 20 (9) | 10 (6) | 10 (18) |
| Number with only a family history of diabetes and/or hypertension and/or ischaemic heart disease (%) | 62 (29) | 56 (35) | 6 (11) |

[a]Figures are mean (SD) unless otherwise stated. BMI = body mass index; HDL = high-density lipoprotein; LDL = low-density lipoprotein; SD = standard deviation.

*Table 2. Clinical data at initial assessment (0 months) and 3 months.*

| | Initial assessment values for those still attending at 3 months (mean [SD]) | Reassessment values at 3 months (mean [SD]) | Mean difference (95% confidence interval) | *P*-value |
|---|---|---|---|---|
| Weight in kg (*n* = 130) | 103.4 (19.6) | 100.4 (19.0) | 3.1 (2.4 to 3.7) | <0.001 |
| BMI (*n* = 130) | 38.4 (6.8) | 37.2 (6.6) | 1.1 (0.9 to 1.4) | <0.001 |
| Waist measurement in cm (*n* = 128) | 117.6 (14.0) | 112.5 (13.5) | 4.9 (4.0 to 5.8) | <0.001 |
| Percentage body fat (*n* = 129) | 44.2 (7.2) | 43.2 (7.4) | 1.1 (0.6 to 1.6) | <0.001 |
| Systolic blood pressure in mmHg (*n* = 115) | 138 (20.8) | 130 (19.5) | 8.3 (5.2 to 11.5) | <0.001 |
| Diastolic blood pressure in mmHg (*n* = 115) | 86 (10.3) | 84 (11.8) | 2.8 (0.5 to 5.1) | 0.020 |
| Total cholesterol:HDL ratio (*n* = 114) | 4.4 (1.0) | 4.3 (0.9) | 0.09 (-0.05 to 0.22) | 0.205 |
| Total cholesterol in mmol/l (*n* = 114) | 5.2 (1.0) | 5.0 (1.0) | 0.22 (0.10 to 0.33) | <0.001 |
| HDL in mmol/l (*n* = 114) | 1.24 (0.30) | 1.20 (0.28) | 0.04 (0.00 to 0.08) | 0.035 |
| LDL in mmol/l (*n* = 111) | 2.97 (0.86) | 2.88 (0.79) | 0.09 (-0.01 to 0.20) | 0.085 |
| Triglycerides in mmol/l (*n* = 114) | 2.28 (1.00) | 2.07 (0.84) | 0.20 (0.07 to 0.33) | 0.004 |
| $HbA_{1c}$ (%) in patients with diabetes (*n* = 35) | 7.87 (1.29) | 7.27 (1.03) | 0.60 (0.25 to 0.96) | 0.001 |

BMI = body mass index; HDL = high-density lipoprotein; LDL = low-density lipoprotein; SD = standard deviation.

being very successful at improving eating habits (70%) compared with those who rated themselves as being very successful at increasing activity levels (50%). The reported usefulness of sessions decreased from 98% when they took place every 2 weeks to 23% when they were 3 months apart. All patients reported that learning about their blood tests and other clinical measurements had been very helpful, and 90% reported that their personal folder was very useful.

## Discussion

### *Summary of main findings*

Patients who completed the 3-month intensive phase of this programme achieved significant weight loss and improvement in coronary heart disease risk factors and psychological wellbeing. Those patients who continued to complete the less intensive 9-month follow-up phase maintained the majority of these improvements. Final evaluation from those completing the programme rated it as a favourable and acceptable treatment. Attrition rates of 40% by 3 months and 65% by 1 year, with assumed lower weight reduction success, shows that a group education and support programme was not a successful weight management method for all patients.

### *Strengths and limitations of the study*

Improving patient access to healthcare services is a national priority.[6] Previous dietetic resources only allowed patients referred to the community dietitian for weight loss advice to receive one appointment. Patients referred to the hospital dietitian received follow-up care that was inconsistent in frequency owing to limited resources and often was not with the same dietitian each time. This programme was delivered by the same dietitian for each group, and in local health centres, avoiding the need for patients to travel to a hospital, where there can be many barriers to attendance. Advice was also tailored to the local population and to shopping and leisure facilities.

Attrition rates were disappointing but similar to those reported by other lifestyle projects.[13,14] Evening or weekend sessions were requested, and together with childcare provision these need to be piloted. Recent initiatives making it easier for patients to attend programmes by holding them in work place and public sector venues have been reported.[15,16] Final patient evaluation by those who continued to 12 months showed that, when the sessions were 3 months apart, less than a quarter of responders found them as helpful as when the sessions were held fortnightly. These were the responses of the most dedicated patients who, despite finding them 'less helpful', did continue to attend. This could help to account for the attrition rate after 3 months.

The group approach allows patients to be seen more often and for longer, enabling more detailed education,

*Table 3. Clinical data at 3 months and 12 months.*

| | 3-month assessment value for those still attending at 12 months (mean [SD]) | Reassessment values at 12 months (mean [SD]) | Mean difference (95% confidence interval) | *P*-value |
|---|---|---|---|---|
| Weight in kg (*n* = 73) | 96.9 (17.1) | 96.5 (16.9) | 0.45 (-0.50 to 1.39) | 0.348 |
| BMI (*n* = 73) | 35.7 (5.6) | 35.5 (5.5) | 0.18 (-0.16 to 0.52) | 0.285 |
| Waist measurement in cm (*n* = 72) | 110.5 (12.2) | 111 (13.0) | 0.16 (-1.21 to 0.89) | 0.761 |
| Percentage body fat (*n* = 73) | 41.8 (7.9) | 41.8 (8.0) | -0.01 (-0.68 to 0.66) | 0.98 |
| Systolic blood pressure in mmHg (*n* = 68) | 130 (18.4) | 135 (20.3) | 5.3 (1.6 to 9.1) | 0.006 |
| Diastolic blood pressure in mmHg (*n* = 68) | 82 (13.0) | 86 (11.0) | 3.1 (0.36 to 5.80) | 0.027 |
| Total cholesterol:HDL ratio (*n* = 70) | 4.3 (1.0) | 3.9 (1.0) | 0.41 (0.21 to 0.61) | <0.001 |
| Total cholesterol in mmol/l (*n* = 70) | 4.9 (0.9) | 5.2 (0.9) | 0.23 (0.01 to 0.45) | 0.044 |
| HDL in mmol/l (*n* = 70) | 1.2 (0.3) | 1.4 (0.3) | 0.19 (0.14 to 0.25) | <0.001 |
| LDL in mmol/l (*n* = 67) | 2.8 (0.8) | 2.9 (0.7) | 0.08 (-0.07 to 0.23) | 0.269 |
| Triglycerides in mmol/l (*n* = 70) | 2.07 (0.87) | 2.02 (1.27) | 0.04 (-0.19 to 0.28) | 0.710 |
| $HbA_{1c}$ (%) in patients with diabetes (*n* = 22) | 6.81 (0.97) | 7.10 (1.47) | 0.28 (-0.12 to 0.68) | 0.157 |

BMI = body mass index; HDL = high-density lipoprotein; SD = standard deviation.

*Table 4. SF-36 parameter scores from assessment to 3 months.*

| SF-36 parameter | Initial assessment score for those patients who continued to 3 months (mean [SD]) | 3-month score (mean [SD]) | Mean difference (95% confidence interval) | *P*-value (*n* = 125) |
|---|---|---|---|---|
| Physical function | 55.1 (28.2) | 61.7 (28.3) | 6.6 (3.0 to 10.2) | <0.001 |
| Role physical | 54.6 (43.3) | 58.8 (41.4) | 4.2 (-3.4 to 11.8) | 0.273 |
| Role emotional | 64.5 (42.1) | 79.7 (65.2) | 15.2 (4.3 to 26.1) | 0.007 |
| Social functioning | 76.8 (29.4) | 83.1 (26.1) | 6.3 (2.2 to 10.5) | 0.003 |
| Mental health | 65.3 (19.6) | 73.0 (16.2) | 7.7 (4.5 to 10.9) | <0.001 |
| Energy and vitality | 45.0 (23.4) | 53.6 (21.8) | 8.7 (4.8 to 12.5) | <0.001 |
| Pain | 55.0 (30.3) | 60.8 (31.2) | 5.8 (1.0 to 10.6) | 0.019 |
| General health perception | 45.6 (22.1) | 56.9 (21.8) | 11.3 (8.3 to 14.3) | <0.001 |
| Change in health | 44.4 (27.5) | 63.6 (26.5) | 19.2 (13.2 to 25.2) | <0.001 |

SD = standard deviation.

support and encouragement.[17,18] Peer support and a sense of camaraderie can also be gained. The final evaluation data showed that those who completed the programme found the group approach enjoyable and supportive. Some patients are reluctant to attend group programmes, and acknowledging this and the importance of patient choice[6] in delivering health care shows the need for a variety of treatment options.

The changes in clinical parameters with weight loss demonstrate the coronary heart disease risk factor improvements expected with weight loss.[19] Patient evaluation shows that they enjoyed learning about their blood tests, blood pressure, waist measurements and percentage body fat levels. These additional indices of progress attracted a great deal of patient interest and appeared motivational, and they could be practically incorporated into any weight management programme.

### *Relationship with the existing literature*

The range of weight changes, from a loss of 23.6 kg to a gain of 3.8 kg, shows the variation in patient progress. A 10% weight loss target is recognised as realistic, and will have numerous health benefits.[19] This target was obtained by 4% of patients at 12 months, but a more substantial 13% (38% of those still attending) did lose between 5% and 10%. Similar weight loss results are reported in other lifestyle interventions,[13,20] and our patients had coronary heart disease risk factors, so that activity and weight loss may be more difficult. Randomised controlled studies using obesity pharmacotherapy also fail to report mean losses of 10%.[21] The majority of patients who successfully reduce body weight are observed to experience some degree of weight regain over time, and this is demonstrated in pharmacotherapy weight loss studies,[21] even with continuation of treatment.[22] The modest weight loss results in this study were maintained over the 9-month follow-up period. This suggests that the lifestyle changes encouraged were adopted into long-term habits. Obesity treatments can be considered successful if modest amounts of weight loss are achieved, there are reduced amounts of weight regain, or if there is a decline or halt to a pattern of gradual gain.[23]

The SF-36 questionnaire results show that the patients scored lower for all parameters compared with population reference scores.[24] This is expected with increasing age, increasing weight, and recent general practice contact. Patients had a mean age of 50 years, which is considerably older than those patients in other weight loss trials,[21,22] they were obese, and many were referred following primary care attendance. Seventy-one per cent of patients had existing coronary heart disease. These factors may limit the ability to increase activity levels. Those still attending at 3 months showed improvements in seven of the SF-36 parameters; those parameters that were not significantly altered included the questions assessing physical function, confirming the difficulties in increasing activity. A sustained increase in physical activity positively correlates with weight loss and weight maintenance,[25] and weight-loss programmes must promote activity changes with dietary adjustment. Increasing physical activity was encouraged at every session, with local leisure services being promoted and information given on general and practical ideas. Patient evaluation indicated that self-rated success with improving eating habits was better than that for improving exercise habits. Greater investment in partnerships with exercise schemes or sessions run by a qualified fitness instructor or physiotherapist on a group and individual basis would allow specific advice to be tailored to patients' health problems, fitness, mobility, and confidence.

*Table 5. Patient evaluation of programme*[a]

| Question | Percentage of patients who rated it highly or very highly |
|---|---|
| How much did you enjoy the weight management programme? | 95 |
| How much support did you get from the group? | 84 |
| How useful was the information covered? | 100 |
| How much of the information was new to you? | 73 |
| How useful was your personal folder? | 90 |
| How successful have you been in improving your eating habits? | 70 |
| How successful have you been in increasing your activity levels? | 50 |
| How useful would it have been to have an exercise class for overweight people as part of the programme? | 83 |
| How convenient was the venue? | 92 |
| How convenient was the time? | 86 |
| How helpful was it to meet initially every 2 weeks? | 98 |
| How helpful was it when the meetings were further apart? | 23 |
| How helpful was it to learn about your blood test results? | 100 |
| How helpful was it to learn about your blood pressure, waist and percentage body fat measurements? | 100 |
| How much would you recommend this programme to others who want to lose weight? | 98 |
| How useful would it be to continue to attend group meetings of this type? | 93 |
| How useful would it have been to have an education session in a supermarket? | 59 |

[a]*n* = 58 (77% of those who completed the programme).

### *Implications for future research and clinical practice*

Early weight loss is a predictor of weight loss outcome in both lifestyle and obesity pharmacotherapy programmes.[26] In this project, those who did not complete the programme had lost significantly less weight at the 3-month stage than those who continued. Questionnaire identification of patients with low motivation or other factors predictive of poor success, such as depression, emotional problems (including binge eating behaviour), mobility problems, or the burden of family ill health, may be used to select those who are most likely to lose weight[27,28] and to identify patients who would benefit from extra support or other weight-loss treatments.[29] Cohesive groups, matched for age, mobility, or medical problems, may provide a more homogenous support network to increase attendance and compliance.[30]

The majority of patients reported that it would be useful to continue attending groups. Long-term support is essential to

encourage progress or achieve maintenance, and partnerships with organisations such as commercial slimming groups may be useful.[31]

Primary care professionals are ideally placed to contribute to obesity-management strategies, including group programmes,[32-34] but it has been shown that programmes that are effective at training primary care health professionals in obesity management are not effective at achieving weight loss when no extra manpower is invested.[35] SRDs may be necessary in the initial training and supervision of programmes, but they are not available in suitable numbers to deliver all patient programmes.

This study suggests the following factors:

- a group programme should be offered as one option for obesity management;
- the possibility of evening and weekend services should be explored, along with options to provide childcare assistance;
- clinical measurements could be practically and routinely incorporated into programmes;
- the collaboration with physical activity programmes or services should be explored;
- regular initial follow-up is essential and some longer-term contact and support is desirable;
- further work is needed to establish the training needs and extra resources required by primary care health professionals to run effective weight management programmes.

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