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Primary care

Improving management of obesity in primary care: cluster randomised trial
Helen Moore, Carolyn D Summerbell, Darren C Greenwood, Philip Tovey, Jacqui Griffiths, Maureen Henderson, Kate Hesketh, Sally Woolgar, Ashley J Adamson

Abstract
Objective To evaluate a training programme intended to improve the management of obesity, delivered to general practice teams.
Design Cluster randomised trial.
Setting Northern and Yorkshire region of England Participants 44 general practices invited consecutively attending obese adults to participate; 843 patients attended for collection of baseline data and were subsequently randomised.
Intervention 4.5 hour training programme promoting an obesity management model.
Main outcome measures Difference in weight between patients in intervention and control groups at 12 months (main outcome measure) and at 3 months and 18 months; change in practitioners' knowledge and behaviour in obesity management consultations.
Results Twelve months after training the patients in the intervention group were 1 (95% confidence interval 1.9 to 3.9) kg heavier than controls (P = 0.5). Some evidence indicated that practitioners' knowledge had improved. Some aspects of the management model, including recording weight, target weight, and dietary targets, occurred more frequently in intervention practices after the training, but in absolute terms levels of implementation were low.
Conclusion A training package promoting a brief, prescriptive approach to the treatment of obesity through lifestyle modification, intended to be incorporated into routine clinical practice, did not ultimately affect the weight of this motivated and at risk cohort of patients.

Introduction
Obesity is now a major public health problem across the world. Easy solutions are unlikely, given the complex interaction between the abundant availability of energy dense food, the ever decreasing demand for energy expenditure in the modern world, and the impact of our genetic make up. Treatment of people who are already obese is difficult; however, several systematic reviews in recent years have shown that diet, exercise, and behavioural approaches, used in combination, are effective management strategies, at least in the short term. The role of primary care in managing obesity in the United Kingdom is linked to achieving targets for the national service framework for coronary heart disease. The Department of Health stated that primary care should "use every opportunity to promote healthy lifestyles" and should provide advice on diet, weight reduction, and exercise. A survey of general practitioners and practice nurses by the National Audit Office identified several factors that they felt would assist them in the treatment of patients, including more information on effective interventions, availability of better materials for advising patients, and better training for staff.

Methods
The method has been reported in detail elsewhere.

Recruitment
We recruited practices from four health authority areas in the Northern and Yorkshire region of England during a four month period. We invited all 161 practices in selected primary care groups to participate, of which we randomised 44 (without financial incentives): 12 in North Durham, 16 in Leeds, 10 in Newcastle, and 6 in Scarborough. All general practitioners and practice nurses in the 44 practices (a total of 245 staff) were eligible to participate. In a pre-
Randomisation

Raab and Butcher did the randomisation, using the method they described in 2001, in which patient level characteristics (body mass index at recruitment, age, and sex) and practice level characteristics (practice size, socioeconomic status, and existence of dietician service) were used to inform randomisation. One permutation of treatment allocation with acceptable balance was randomly selected, a method that ensured equal numbers of practices and approximately equal numbers of patients in both treatment arms. Researchers collecting baseline data contacted a distant member of the practice team as soon as possible after completion of baseline data collection, so that all patients had been weighed within two months of randomisation. All practices were randomised simultaneously in June 2000.

Intervention

At the start of the intervention period, we provided all practices with a list of their patients who had entered the trial. The educational strategy was based on a previous nutrition training programme. We delivered three 90 minute sessions, intended to be delivered at intervals of no less than one week and no more than two weeks apart, to the 22 intervention practices. We asked all general practitioners and practice nurses to attend all three sessions. Four dietitians were trained in the standardised delivery of the training and then delivered the programme to small group, multidisciplinary general practice teams. The programme promoted a model approach to obesity treatment, which incorporated best evidence and was perceived to be brief enough that primary care staff could deliver it to their patients. The training covered information on the clinical benefit of weight loss and effective treatment options, including reduction of dietary energy intake, increased physical activity, and pharmaceutical intervention.

The model of obesity management entailed practitioners seeing patients regularly (about every two weeks) until they had lost 10% of their original body weight and then less regularly (about one to two months) for maintenance of weight over a sustained period. Current and target weight and dietary and activity targets were to be recorded in the patients’ records to facilitate continuity of support across practice teams. Prescription of a moderate energy deficit diet was advocated, as recommended by the Scottish Intercollegiate Guidelines Network. A “ready reckoner” was produced to allow practitioners to estimate a patient’s daily energy requirement and then to calculate a daily 500 kcal (2.5 MJ) deficit. Diet sheets and supporting written resources facilitated the dietary prescription to patients. At the end of the three

Fig 1 Flow of practices and practice staff through the trial

Fig 2 Flow of patients through the trial
training sessions, practices devised individualised weight management protocols based on the model and were encouraged to implement this with patients recruited to the study. Control practices were asked to provide usual care to their patients.

Outcome measures
The primary outcome measure was difference in mean weight of patients between intervention and control practices 12 months after the intervention. We also measured difference in weight at three months and 18 months post-intervention. We measured knowledge of obesity management and self reported behaviour in obesity management consultations for all practice staff before and after the intervention. We gathered this information by using a questionnaire designed by us and field tested with staff from non-participating practices.

Process assessment
Practices had no trial specific responsibility to see patients once the training intervention had been delivered. We used process assessment to provide insight into the implementation of the weight management protocol. Researchers extracted information from the medical records of those patients still participating in the trial, in both arms, one year after the intervention. These data included whether patients had been seen about their weight and whether weight, diet, and exercise targets had been recorded as advocated in the intervention.

Sample size and analysis
A clinically significant effect of intervention can be achieved with as little as 5% (or 3-5 kg) weight loss in obese people. We designed the study to have 80% power to detect a mean difference in weight between treatment arms of approximately 3-5 kg, assuming 5% significance and a within practice correlation coefficient of 0.05. Allowing for withdrawal and loss to follow up of 15%, this gave a required number of patients per treatment arm of approximately 660, equivalent to 22 practices recruiting 30 patients each. We collated all data on a purposefully designed database by using Microsoft Access software. We analysed change in both continuous and categorical outcome variables by using STATA to account for both within cluster and between cluster variation. We did analyses on an intention to treat basis, where possible.

Blinding
Patients were not aware of the intervention status of their practice, and researchers collecting outcome measurements from patients were blind to the intervention status of the practices, both before and after the intervention. Double blinding was not possible in this trial, as practice staff were inevitably aware of whether or not they had been trained.

Results
All 44 practices completed the trial. One practice (allocated to the intervention group) declined the training intervention but agreed to continue with outcome assessment, and one would only consent to the training if two of the three sessions were combined. Training was delivered between June and November 2000. This extended intervention period was due to difficulties in arranging training sessions in practices.

In total, 991 patients gave consent, of whom 843 (85%) attended for collection of baseline data and were subsequently randomised. Table 1 shows the characteristics of the practices and patients after randomisation. Table 2 shows the measurement of the difference in weight and body mass index between patients from intervention and control practices. Table 3 shows the measurement of the difference in knowledge levels between control and intervention practitioners after the training. The odds ratio of providing the correct response was higher for trained practices for all but one of the five questions, but only two of these reached statistical significance.
occasions than patients in control practices in the year after the delivery of the training. Trained practices were more likely to discuss weight (odds ratio 2.0, \( P = 0.003 \)), and the records of patients from trained practices were more likely to include weight (odds ratio 2.0, \( P = 0.004 \)), target weight (13.6, \( P \leq 0.001 \)), and dietary targets (4.5, \( P = 0.02 \)).

**Discussion**

The rapid increase in the incidence of obesity and associated comorbidities presents a major challenge to health care in the United Kingdom. The National Audit Office reported a lack of “buy in” towards management of obesity on the part of general practitioners, but also that training, information on the effectiveness of interventions, and resources to use with patients would assist them in the task. Our findings indicate that a training package promoting a brief and prescriptive approach to the treatment of obesity by using lifestyle modification, and intended to assist primary care staff incorporating such treatment into routine care, did not ultimately affect the weight of this motivated and at-risk cohort of patients.

**Impact of the intervention**

The training was well received and was based on an acceptable model applied in a previous study. Practitioners’ knowledge of the principles of obesity management improved, and trained practitioners were more likely to implement weight management strategies promoted in the training. Patients from trained practices were seen more often and were more likely to have weight, target weights, and dietary targets documented in their records, but in absolute terms the level of implementation was low. Target weights were recorded for only 14% of participating patients in trained practices, compared with just 3% of participants in control practices, in the year after delivery of the training. Patients in trained practices attended two more consultations than did those in control practices, averaging eight consultations in the year after the intervention. Treatment as per protocol would entail fortnightly follow up until 10% of initial body weight was lost, potentially some 20 or more consultations in the year. The low level of implementation of the obesity management model means that we cannot draw conclusions about its effectiveness.

The training programme was realistic in terms of the type of training that might be delivered to primary care teams by NHS dietitians. Obesity management is complex, and strategies that have shown promise in the literature include the application of behaviour change techniques, antiobesity drugs, and promotion of higher levels of physical activity. Undoubtedly, a four and a half hour training programme can only scratch the surface of these issues. Even so, several general practitioners from these motivated practices expressed misgivings about the need to devote so much time to the subject, and indeed more in-depth training for practice teams is unlikely to be feasible, set against competing educational priorities in general practice.

**Strengths and weaknesses of the study**

Several previously recognised characteristics of obesity treatment trials were evident in our study. Samples are usually biased towards women, and our sample was predominately female. In addition, our sample was skewed towards more extreme obesity. Retention of participants in obesity trials is recognised as problematic, and it was potentially an even greater problem in our study, as the intervention was aimed at practices and it may have been difficult for patients to see any benefit from participation. Despite the observed loss to follow up of patients, the study maintained 80% power owing to a negligible within practice correlation coefficient for the main outcome variable.

Using the general practice as the unit of randomisation reduces the possibility of contamination between treatment arms by minimising the risk of contact between health professionals from different arms. As stated earlier, in an effort to further eliminate contamination, we offered training only to general practitioners and practice nurses. In reality, enforcing this research condition was difficult, and many additional practice staff, including district nurses and health visitors, turned up for the training. We detected no evidence of contamination between intervention groups, but this cannot be ruled out.

**Conclusion**

This training programme resulted in only limited implementation of an approach to obesity management and did not achieve improved patient weight loss. A more in-depth training programme might be more successful at changing practitioners’ behaviour but is unlikely to be generalisable to most general practices in the United Kingdom. Other strategies to manage obesity in primary care urgently need to be considered and evaluated. These might include motivated and dedicated obesity specialists placed at the level of the primary care trust, use of leisure services, and use of the commercial weight loss sector.

We thank the dietetic managers, Chris Wyn-Jones (North Durham), Julia Smith (Newcastle Nutrition), Sue Waddington (Scarborough), and Celia Firmin (Leeds Community Dietetics) for their contribution to the study design and help to ensure its smooth running; Andy Vail (Hope Hospital, Salford) for his ini-

<table>
<thead>
<tr>
<th>Question</th>
<th>Intervention (n=668)</th>
<th>Control (n=650)</th>
<th>Odds ratio (95% CI)</th>
<th>( P ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has patient been seen since end of intervention? (n=668)</td>
<td>317 (94)</td>
<td>318 (96)</td>
<td>0.6 (0.3 to 1.3)</td>
<td>0.23</td>
</tr>
<tr>
<td>Median No of times (n=658)</td>
<td>6</td>
<td>6</td>
<td>1.3 (1.0 to 1.6)*</td>
<td>0.05</td>
</tr>
<tr>
<td>Is there evidence that weight has been discussed? (n=650)</td>
<td>186 (57)</td>
<td>129 (49)</td>
<td>2.6 (1.3 to 3.2)</td>
<td>0.003</td>
</tr>
<tr>
<td>Has weight been recorded? (n=650)</td>
<td>197 (61)</td>
<td>137 (42)</td>
<td>2.0 (1.3 to 3.3)</td>
<td>0.004</td>
</tr>
<tr>
<td>Has a target weight been recorded? (n=643)</td>
<td>48 (14)</td>
<td>9 (3)</td>
<td>13.6 (4.2 to 44.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Have dietary targets been recorded? (n=648)</td>
<td>48 (15)</td>
<td>14 (4)</td>
<td>4.5 (1.2 to 16.7)</td>
<td>0.02</td>
</tr>
<tr>
<td>Have exercise targets been recorded? (n=648)</td>
<td>48 (14)</td>
<td>25 (8)</td>
<td>1.9 (0.7 to 5.0)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

*Estimate and confidence interval for attendance rate ratio.

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**Table 4** Difference in process outcomes between patients from intervention and control practices after training. Values are numbers (percentages) responding “Yes” unless stated otherwise.
What is already known on this topic

Most obesity management in the United Kingdom takes place in primary care, but the approach is not coordinated or consistent. Evidence shows that lifestyle modification can be effective in the treatment of obesity. The Department of Health expects primary care to deliver weight management to obese patients.

What this study adds

A brief training programme delivered to primary care improved practitioners’ knowledge and behaviour but did not result in improved weight loss in obese patients. Implementation of the brief, prescriptive weight management model promoted in the training was low. This raises questions about the feasibility of primary care practitioners incorporating weight management into routine clinical care.

Contributors: HM was responsible for the conception, design, analysis, interpretation, and project management of the study and produced the first draft of this manuscript. DCG contributed to the design and was involved in project management, interpretation of results, and the second draft of the manuscript. PT contributed to the design of the study, was part of the advisory committee, and contributed to the manuscript. JG, MH, KH, and SW contributed to the project design, helped to develop and deliver the intervention, carried out data collection, and contributed to interpretation of results and to the manuscript. AJA was the principal investigator, supervised HM, shared responsibility for conception, design, interpretation, and project management, and contributed to the manuscript. HM and AJA are the guarantors.

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Ethical approval: The Northern and Yorkshire regional medical research ethics committee and five local research ethics committees approved the study.

References

1 Centre for Reviews and Dissemination. The prevention and treatment of obesity. EfE Health Care 1997;3(2).