A cluster randomised trial to evaluate a nutrition training programme

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SUMMARY

Background: *The need for training to equip primary care staff with the knowledge and skills to provide dietary advice to the public has been acknowledged. Little is known about the effectiveness of such training at improving the dietary counselling skills of multidisciplinary practice teams.*

Aim: *To evaluate the effectiveness of a nutrition training programme, delivered to primary care teams by a dietitian.*

Design of study: *A paired-cluster randomised trial.*

Setting: *Twelve general practices in Sunderland, in the United Kingdom.*

Method: *A nutrition training programme, aimed at improving the quality of dietary consultations, was developed and delivered to six primary care teams by a dietitian. Main outcome measures were patients' recall of seven key consulting behaviours. Data were collected from patients in intervention and control practices, pre- and post-intervention. Change in knowledge and attitude of practitioners was also measured.*

Results: *All 12 practices completed the trial. Data were collected from 251 patients pre-intervention and 228 patients post-intervention. Of the seven consulting behaviours targeted in the training, only the proportion of consultations where written information (diet sheets) was provided to patients was significantly higher (13% higher, 95% confidence interval [CI = 4 to 21,* P = *0.004) in the intervention practices post-training. Some evidence of improved practitioner knowledge and attitude was detected.*

Conclusion: *This evaluation of a nutrition training intervention detected only a limited impact on the behaviour, knowledge, and attitudes of primary care practitioners in dietary consultations.*

Keywords: *dietary advice; randomised controlled trial; multidisciplinary team; consulting behaviour; nutrition training.*

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Submitted: 17 April 2002; Editor's response: 5 July 2002: final acceptance: 18 December 2002.

Introduction

STRATEGIES currently employed to reduce the burden of coronary heart disease (CHD) include the implementation of policies to promote healthy eating by primary care organisations.[1] On the whole, there is now consensus regarding an optimum diet for the prevention of CHD,[2,3] although the evidence concerning the effectiveness of nutritional interventions is mixed.[4] A recent systematic review of studies that examined the role of dietary fat in the prevention of cardiovascular disease supported the central role of dietary fat.[5]

It has been suggested that primary care is particularly well placed to provide dietary advice to the public.[6,7] However, surveys suggest that both general practitioners (GPs) and nurses have mixed feelings about this role. Lack of nutritional knowledge, lack of confidence, dissatisfaction with the level and quality of their pre- and post-registration nutrition training,[8] and lack of evidence of benefit from involvement in nutritional interventions,[9] are cited as barriers to greater involvement.

In 1994, the United Kingdom (UK) Department of Health acknowledged the need for training to equip primary care staff with the knowledge and skills to provide dietary advice to the public.[6] Eight years on, there is still little in the way of formal education about nutrition for GPs or nurses. In addition, although previous British work has reported that training in nutrition can improve the nutritional knowledge of practice nurses,[10] there is little evidence of the transfer of learning to consultations with patients.

Belfield *et al*[11] described levels of effectiveness for the evaluation of medical education, spanning from the ultimate aim of change in patient health outcome, via change in professional practice, learning, or knowledge gain, through to effects that are easier to measure, including satisfaction of participants and participation rates. This paper describes the evaluation, via a cluster randomised trial, of a training programme (the intervention), aimed at improving the quality of dietary consultations delivered by general medical practice teams (unit of randomisation) to their patients. Effectiveness was assessed at the following levels: change in practitioner behaviour in the dietary consultation as recalled by patients (a measure of transfer of learning to the workplace); and change in practitioner attitude towards, and knowledge of, diet in the management of CHD. Participant satisfaction and attendance rates were also collected.

Method

This was a paired-cluster randomised trial with pre- and post-intervention assessment of outcome measures in both intervention and control arms. The project outline is given in Figure 1. Sunderland Local Research Ethics Committee granted ethical approval before the study started.

HOW THIS FITS IN

What do we know?

Primary care has been cited as a suitable venue for the management of conditions that require the integration of nutritional knowledge with behavioural techniques shown to enhance effectiveness. Staff receive little pre- or post-registration training in these areas and little is known about the impact of such training on the practice.

What does this paper add?

Most work evaluating implementation strategies has been carried out with unidisciplinary groups. This randomised study evaluated the impact of a training programme on the consulting behaviour, nutritional knowledge, and attitude of multidisciplinary practice teams.

Setting and participants

The trial was conducted during the years 1997 and 1998 in Sunderland, an industrial city in the north-east of England. At the time, Sunderland general practices had higher-than-average list sizes and problems with recruitment and retention of GPs. All 53 general medical practices in the Sunderland Health Authority area were invited to participate in the trial, of which 18 expressed interest and 12 agreed to take part, without financial incentives. The 12 practices were stratified according to the number of partners and their fundholding status, forming six pairs matched on these factors. The practice pairs were well matched, with equal numbers of fundholders in each group and being within plus or minus one partner. Other practice level characteristics were not accounted for in the stratification. The practices in each pair were then randomly assigned to either the control or the intervention group. The nutrition training programme was

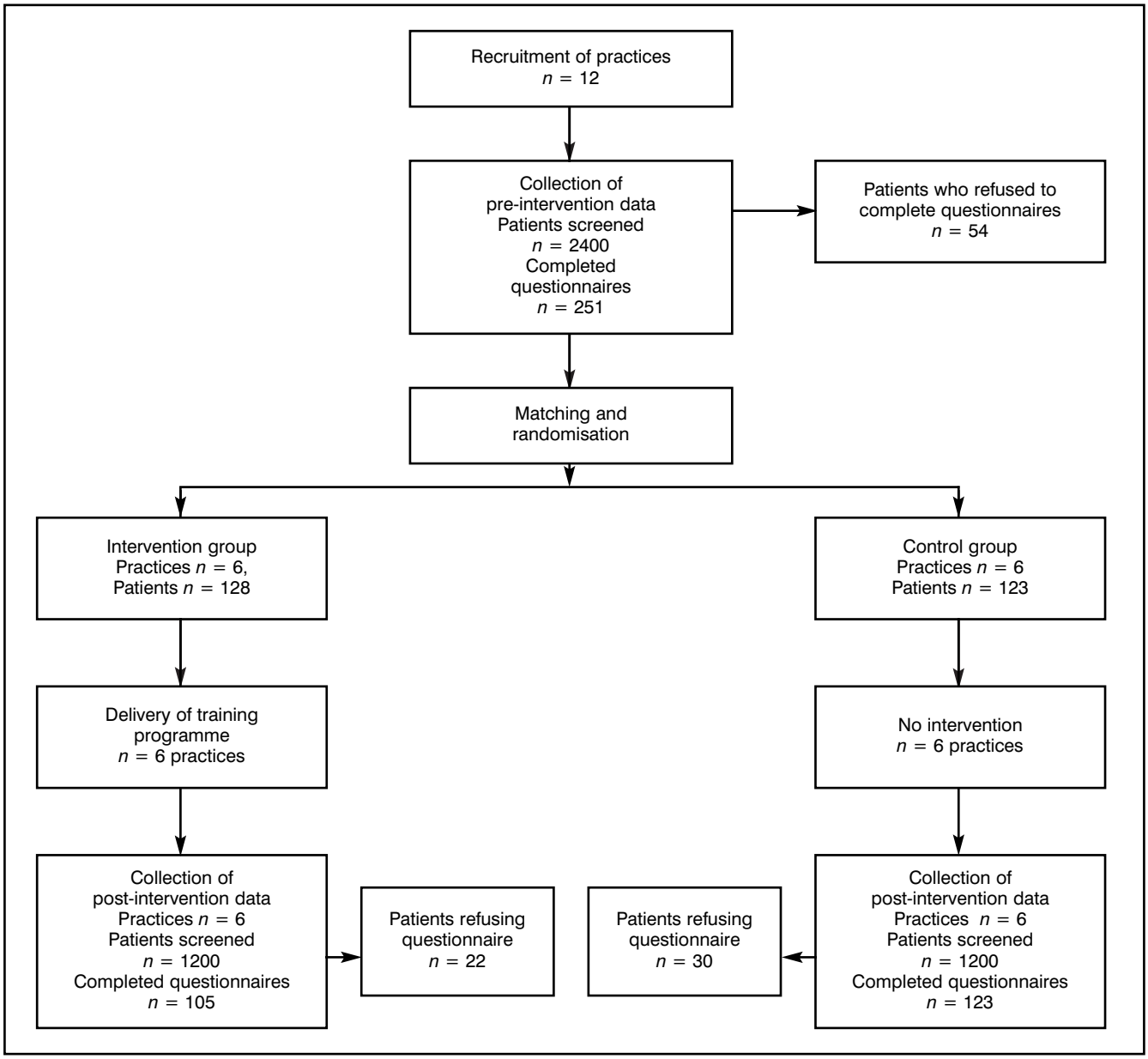

Figure 1. Project summary.

- When you saw the doctor or nurse just now, did you talk about food or what you eat?
- Did you talk about how you cook or prepare food?
- Did you talk about diet or your weight?

Box 1. The patient screening questions.

delivered to the six intervention practices. The six control practices received no intervention.

Practices were asked to identify their practice teams, in terms of the people who might ever be required to provide dietary advice as part of their role. One hundred and nine staff were identified as being eligible to participate.

Two hundred consecutive patients were approached after their consultation in each of the 12 practices, during defined data collection sessions, pre- and post-intervention. All patients who could speak English, or who were accompanied by someone who could speak English, were eligible to participate. Researchers asked a set of screening questions (Box 1) of every patient leaving the consulting rooms of all GPs and nurses, which determined whether or not diet had been discussed in the consultation. A self-administered questionnaire was given to patients who had discussed diet.

The intervention under trial

Development of the training programme was informed by best available evidence, for both effective continuing medical education interventions[12,13] and nutrition education.[14,15] A mixture of large and small group, multidisciplinary teaching, based on adult learning principles and incorporating educational outreach,[16] was used. Emphasis was placed on increasing practitioners' motivation to improve the quality of dietary consultations and to provide them with practical skills adapted from behaviour change models.[17-19] The elements that were included, such as patient assessment, education and goal setting, have been judged to be of great importance to public health in areas such as problem drinking.[20]

Phase 1 (three standardised 90-minute sessions) was held in central venues and launched by a local clinical opinion leader. Phase 2 (two 90-minute sessions) was delivered on practices' own premises, and focused on practicing skills. Participants received a pack, which included diet sheets and teaching aids to use with patients. A 15-minute educational outreach session, covering key messages and patient resources, was delivered to practitioners who did not attend the first phase of training. The intervention involved a maximum of 7.5 hours of contact training time for practice teams, over a six-month period.

The specific objectives of the training package were:

- To increase the proportion of dietary consultations that included an assessment of the patient's current eating patterns;
- To increase the proportion of dietary consultations in which verbal advice was accompanied by written advice;
- To increase the proportion of dietary consultations in which patients were involved in deciding which dietary changes to make;
- To increase the proportion of specific and measurable dietary advice given;
- To increase the proportion of dietary advice where an increased intake of fruit and vegetables was recommended;
- To improve the knowledge of the role of diet in the prevention and management of CHD;
- To improve the confidence of primary care practitioners in dealing with dietary matters; and
- To improve the attitude of practitioners regarding the role of nutrition in primary care.

Outcome measurement

The patient questionnaire to assess practitioner behaviour in the consultation was developed by the project team with local dietitians and piloted in a neighbouring health authority. Data were collected pre-intervention in all practices and repeated with a different sample of patients post-intervention. Outcome measures were collected in both arms of the trial at approximately the same time.

Measurement of practitioner knowledge and attitude regarding diet and CHD was achieved using a self-administered questionnaire pre- and post-intervention in both trial arms. The questionnaire was based upon a previously published study, which assessed the effectiveness of a nutrition training programme delivered to practice nurses,[10] with some updating to reflect the latest nutritional guidelines. A case study was used to assess application of knowledge. Dietitians from the local dietetic department were asked to complete the case study to develop a coding frame of appropriate responses. Responses from practitioners were later coded as 'appropriate' or 'inappropriate' by an assessor blind to the intervention status of the practices. Where further clarification was required the assessor discussed the practitioner response with one of two authors by telephone, without disclosure of the intervention status. Nutrition questionnaires were distributed to the same cohort of staff before and after the training programme.

Sample size considerations

Number of practices: a sample of 12 practices was included in the project, based on a pragmatic decision, taking into account the amount of training that could be delivered by one dietitian, and allowing a reasonable number of practices for allocation to the treatment arm.

Number of patients: with 12 practices each recruiting 20 patients, the study would have 90% power to detect a difference between the two arms of 20 percentage points (20% versus 40%) with a between-cluster (within-pair) variance of zero, or 80% power with a between-cluster variance of 0.005.[21] A difference of 20% was chosen as an estimate of clinically relevant change. An estimated 12% would have discussed diet in the consultation[22] and would therefore be eligible to complete a questionnaire. To yield 20 patient questionnaires per practice, 200 patients were screened in each practice.

Blinding

Both the patients and the researchers collecting patient data

were blind to the intervention status of the practices. Practitioners were not told when researchers would collect data from patients, although it is acknowledged that they might have discovered that researchers were in the practice during the course of the data collection session. Owing to the nature of the intervention it was not possible to blind intervention status from either the dietitian delivering the training or the practitioners receiving it.

Statistical analysis

Data were analysed using SPSS 9 and Stata 7. The type of advice given by practitioners, and the responses for each question in the practitioner questionnaire, were compared using a random effects meta-analysis across cluster pairs.[21,23] Confounding was controlled for by the randomisation process. The robustness of conclusions to the effects of any residual confounding were confirmed by secondary analyses, adjusting for potential confounders in the random effects model.

Results

All 12 practices completed the trial. Demographic characteristics of participating patients and practitioners are shown in Table 1. The training was well received, with over 80% of those who attended judging it relevant and useful to their work. Seventy-three per cent (n = 18) of GPs, 100% (n = 11) of practice nurses, and 100% (n = 21) of other staff attended two or more training sessions (at least 3 hours contact time). Baseline knowledge and consulting behaviours are reported elsewhere.[24]

Change in behaviour

Table 1 shows the number of patients who stated that they had discussed diet in the consultation they had just left, and the number who went on to complete a questionnaire. The main reason for refusing to complete a questionnaire was lack of time. Table 2 shows the difference in the proportion of desirable consulting behaviours, as reported by patients, between trained and control practices. Adjustment for baseline values made little difference to the results. Of the seven consulting behaviours measured, only the provision of written information (diet sheets) was significantly different after the training. This was 13% higher (95% confidence interval [CI] = 4 to 21, P = 0.004) in trained practices. The difference in the proportion of patients asked to make changes to what they eat was 14% higher (95% CI = –3 to 31; P = 0.11) in trained practices, but the confidence interval was wider, and this failed to reach statistical significance.

Change in knowledge and attitude

The response rate to the practitioner questionnaire was 77% (84/109) at baseline and 59% (64/109) post-training. While trained practitioners were 30% (95% CI = 12 to 50, P = 0.001) more likely to believe that their knowledge was up to date than did practitioners from control practices, other improvements in perceived and actual knowledge failed to reach statistical significance.

Table 3 shows the self-rated attitude of practitioners towards nutrition, post-training. Estimate of change in attitude was positive in all but one of the elements measured (this was not shown, 100% agreed in all practices). Confidence intervals, however, were wide and did not reach

Table 1. Demographic characteristics of patients and practitioners completing the questionnaire.

Characteristics *n*	Before training		After training	
	Intervention	Control	Intervention	Control
Patients (two independent groups)				
Screened	1200	1200	1200	1200
Refused screening question	1	1	0	0
Discussed diet (%)	145 (12)	160 (13)	127 (10)	153 (13)
Completed questionnaire (%)	128 (88)	123 (77)	105 (83)	123 (80)
Mean age (SD)	49 (20)	44 (21)	45 (21)	39 (24)
Male (%)	50 (39)	38 (31)	40 (39)	56 (46)
Practitioners				
Total number	42	42	30	34
Professional group (%)				
GP	15 (36)	18 (43)	12 (40)	14 (42)
Practice nurse	10 (24)	7 (17)	9 (30)	9 (27)
Health visitor	6 (14)	5 (12)	5 (16)	3 (9)
District nurse	7 (17)	9 (21)	0	6 (18)
GP trainee	1 (2)	0	2 (6)	0
Midwife	2 (4)	1 (2)	0	1 (3)
Nurse practitioner	0	1 (2)	2 (6)	0
Other	1 (2)	1 (2)	0	0
Year of qualification (%)				
1950 to 1959	0	1 (2)	0	0
1960 to 1969	5 (12)	6 (14)	5 (16)	6 (18)
1970 to 1979	18 (42)	9 (21)	13 (43)	8 (24)
1980 to 1989	14 (33)	21 (50)	9 (30)	14 (42)
1990 to 1999	5 (12)	5 (12)	0	5 (15)
Male (%)	14 (33)	16 (3)	11 (37)	13 (39)

SD = standard deviation.

Table 2. Weighted pooled difference in reported consulting behaviours post-intervention.

	Percentage of positive responses in intervention practices	Percentage of positive responses in control practices	Weighted difference (%)[a] (intervention – control) (95% CI)	*P*-value
Asked about food eaten at that time	62	61	-6 (-18 to 6)	0.31
Asked to change food eaten	45	26	14 (-3 to 31)	0.11
Involved in decisions	55	62	-5 (-36 to 26)	0.74
Advice was helpful	91	100	-8 (-24 to 8)	0.33
Given a leaflet	19	6	13 (4 to 21)	0.004
Advice was food-specific	21	11	6 (-2 to 15)	0.14
Advice was about increasing intake of fruit and vegetables	12	4	2 (-5 to 10)	0.60

[a]Where absolute percentages appear inconsistent with the weighted pooled difference, this is because of rounding and because it is the differences between practices that are weighted and pooled, rather than the percentage in each practice or the average in each arm.

Table 3. Weighted pooled difference in self-rated attitude towards nutrition, post-training.

	Intervention practices	Control practices	Weighted difference (%)[a] (intervention – control) (95% CI)	*P*-value
Percentage (*n*/N) who are usually or always successful at helping patients change their diet	16 (5/31)	15 (5/33)	7 (-26 to 39)	0.68
Percentage (*n*/N) that agree slightly or completely that:				
Primary care has an essential role in giving dietary advice	100 (31/31)	97 (32/33)	3 (-11 to 17)	0.65
There is not enough time in primary care to advise on diet	75 (23/31)	73 (24/33)	7 (-13 to 28)	0.48
Advice has no impact on what people eat	29 (9/31)	30 (10/33)	4 (-16 to 24)	0.69

[a]Where absolute percentages appear inconsistent with the weighted pooled difference, this is because of rounding and because it is the differences between practices that are weighted and pooled, rather than the percentage in each practice or the average in each arm.

Table 4. Weighted pooled difference in responses to case study, post-training.

	Percentage of positive responses in intervention practices (*n*/N)	Percentage of positive responses in control practices (*n*/N)	Weighted difference (%)[a] (intervention – control) (95% CI)	*P*-value
Were all dietary questions appropriate?	42 (13/31)	33 (11/33)	8 (-58 to 74)	0.84
Were all pieces of dietary advice provided appropriate?	74 (23/31)	40 (13/33)	30 (7 to 52)	<0.01

[a]Where absolute percentages appear inconsistent with the weighted pooled difference, this is because of rounding and because it is the differences between practices that are weighted and pooled, rather than the percentage in each practice or the average in each arm.

significance. Table 4 shows the responses to the case study. Practitioners from trained practices were 30% (95% CI = 7 to 52, $P = 0.01$) more likely than controls to provide dietary advice that was completely appropriate.

Discussion

This study applied a quantitative method to the evaluation of a nutrition training intervention delivered to primary care teams by a dietitian. A 1992 report described the levels of health-promoting activity in primary care as disappointing,[22] and our study shows that the proportion of dietary consultations has changed little since then. However, our intervention was not intended to increase the proportion of consultations about diet; the primary aim of the training package was to promote a range of consulting techniques that we judged could realistically be applied within current time constraints of primary care, aimed at improving the quality of the dietary consultation.

In this study the nutrition training programme was evaluated on several levels, and at the simplest level the training was well attended and enjoyed by practice teams. However, only a limited impact on nutritional knowledge and attitude towards dietary interventions, and little evidence of application of the consulting techniques to clinical practice, was demonstrated. Four of the seven consulting behaviours promoted in the training occurred more frequently in trained practices at the end of the trial; however, for all except one of these, 95% confidence intervals included the possibility of no effect or a negative effect.

Hutchinson recognised that measuring transfer of learning to the workplace is difficult because of the complexity of behaviour change.[25] Given the small size of the trial, the problems with contamination of controls, and dilution of intervention outlined below, it is perhaps encouraging that some positive behaviour changes were detected. Anecdotal comment from primary care staff to the trainer suggested that the consulting techniques promoted, such as assessment of current food intake and negotiation of dietary

targets, would provoke too much discussion with the patient, causing an unacceptable increase in consultation time.

Baseline levels of nutritional knowledge were high in all practices, possibly owing to a pre-existing enthusiasm for the topic, but with some notable areas of weakness, including dietary sources of fat, as noted in previous work.[8] A previous study noted the greatest improvement in nutritional knowledge among staff with low baseline levels.[10] The response rate to the practitioner questionnaire was quite low post-training. In many cases it was difficult to persuade staff of the need to complete the same questionnaire twice, and of the non-responders post-training, most were GPs and district nurses. Trained practitioners were better able than controls to apply nutritional knowledge in the case study. Francis and Roche[26] found that health workers were unable to focus dietary advice on an individual patient case and hence provided some irrelevant advice. In our case study the proportion of practitioners who were able to provide advice that was completely appropriate was higher in the intervention compared with the control practices at the end of the training. This improvement was matched by an increased perception, in that their nutritional knowledge was more up-to-date.

Study strengths and limitations

We used patient recall as an indication of practitioner behaviour, which allowed collection of information on the consulting behaviours of a large number of practitioners, with minimal intrusion into the consultation. This method may result in less change in practitioner behaviour than direct observation by video or audio tape recording. Wilson and MacDonald[27] compared patient questionnaires with audio taping as a means of assessing behaviour in the consultation and found it to be a fairly sensitive tool. It has been shown that patients can forget aspects of the consultation,[28] and an attempt was made to minimise this by collecting data immediately after the patient left the consulting room. Over-reporting of socially desirable responses might also be expected,[29] but would be equally evident in both trial arms.

Three factors could have reduced our ability to detect an effect of intervention. First, while the sample size was sufficient to detect changes in consulting behaviour reported by patients, it had less power to detect differences in secondary outcome measures, i.e. change in knowledge and attitude reported by practitioners. For example, a weighted difference between groups of 28% regarding diet and CHD did not reach statistical significance. Second, the training intervention was specific to diet and CHD, and one would expect the greatest impact on consulting behaviour to occur with patients consulting with this condition. However, behavioural outcome data were collected from patients who had consulted on any dietary matter, and this could dilute the effect of the intervention. Third, not all practitioners in the intervention practices attended the training, although data were collected from patients consulting with all practitioners. This intention-to-treat analysis, however, correctly tests the policy of inviting practitioners for training, whether they accept it or not, and is the only unbiased analysis maintaining randomisation.

Health visitors, district nurses, and dietitians who attended the training, but who work between practices, may have constituted a source of contamination between control and intervention arms of the trial. Diet sheets produced to accompany the training were observed in control practices at post-intervention data collection.

The trial design also influenced the ability to detect change. Cluster randomisation reduces the units available for allocation to trial arms; this trial included 12 practices (clusters), and so was relatively small. A larger trial would have allowed more precise estimation of the effect of intervention and detection of smaller differences in practice. In theory, it would have been possible to allocate individual practitioners to the treatment arm. However, a cluster randomised trial was justified because the training promoted a team approach to dietary interventions, and much of the training was delivered to practice teams.

Outcome measures were taken immediately after completion of the training programme in all practices, with no longer-term follow-up. Belfield *et al*[11] recognised that outcomes from education might 'emerge over a period of time which is not possible for researchers to monitor'.

Primary care is often cited as a suitable venue for the lifestyle management of health issues, such as the treatment of obesity,[7] where behavioural techniques are known to enhance the effectiveness of the treatment strategies. If these evidence-based strategies are to be integrated into general practice, then the provision of training for existing staff alone is unlikely to provide a simple solution.

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Acknowledgements

We would like to thank the general practices and their patients, the Department of Nutrition and Dietetics at Sunderland Royal Hospital, and Mrs Alison Cullen, for their help with this project. In addition, thanks to Nick Steen, Centre for Health Services Research, University of Newcastle, for statistical advice, and researchers from the Human Nutrition Research Centre, University of Newcastle, for assisting with data collection. This project was funded by the NHS Executive, Northern and Yorkshire.