The Southampton Initiative for Health

A Complex Intervention to Improve the Diets and Increase the Physical Activity Levels of Women from Disadvantaged Communities

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Abstract

The Southampton Initiative for Health is a training intervention with Sure Start Children's Centre staff designed to improve the diets and physical activity levels of women of childbearing age. Training aims to help staff to support women in making changes to their lifestyles by improving three skills: reflection on current practice; asking 'open discovery' questions; and goal-setting. The impact of the training on staff practice is being assessed. A before and after non-randomized controlled trial is being used to evaluate the effectiveness and cost-effectiveness of the intervention in improving women's diets and increasing their physical activity levels.

178

Introduction

FINDINGS from the Southampton Women's Survey have shown that women who are disadvantaged by leaving school with few or no educational qualifications have less varied and balanced diets than women with qualifications (Robinson et al., 2004). The survey has demonstrated also a link between the quality of the mother's diet and the diets of their children: those with the least healthy diets were found to be less likely to follow guidance on optimal patterns of infant feeding (Robinson et al., 2007). Data from the survey have shown that women living in disadvantaged areas of Southampton are less likely to take part in regular strenuous exercise that would be beneficial to their health (Wilkinson & Inskip, 2006).

Focus groups and surveys carried out with women from Southampton have shown that those who have the poorest quality diets feel that they lack control over the food choices they make for themselves and their families; feel less positive about the potential benefits of eating healthily; are less interested in food shopping, preparation and consumption; and have less social support for eating healthily than women with better quality diets (Barker et al., 2008; Lawrence et al., 2009). A general sense of control over life appears to be an important determinant of the quality of diet of women who have lower levels of educational attainment—a marker of disadvantage (Barker et al., 2009), which suggests that interventions to improve sense of control in this population could have significant effects on their diet.

Control and self-efficacy

The notion of control and its role in determining the quality of women's diets is suggestive of the role that self-efficacy plays in Bandura's (1986, 1998) social cognitive theory of the socio-environmental and personal determinants of health. Self-efficacy is a central construct in this theory, and describes an individual's belief that they are capable of carrying out a specific behaviour, which implies that they also have the knowledge and skills to do so. In this case, it would describe a woman's belief that she was able to feed herself and her family a healthy diet, based on her knowledge of healthy eating and her confidence and skill in preparing healthy food. Interventions that increase self-efficacy have been shown to lead to increases in fruit and vegetable consumption (Steptoe, Perkins-Porras, Rink, Hilton, & Cappucio, 2004). Higher levels of self-efficacy

have been found to predict women's ability to increase their levels of physical activity (Luszcznska & Haynes, 2009). Bandura suggests that a strong sense of self-efficacy is required for someone to exercise control (Bandura, 1998), and that individuals only feel in control of a situation if they believe that they have the ability to carry out the action required of them. In this analysis, self-efficacy is a prerequisite for a sense of control, and experience of exercising control in turn builds up a sense of self-efficacy (Bandura, 1995). It is this increase in self-efficacy and control that enables people to make changes to their lives. This is the premise on which the intervention described in this article is based.

Patients as experts

Building self-efficacy and giving control over their condition back to patients are the primary aims of the Department of Health's Expert Patient Programme. This is a self-management intervention programme intended to provide knowledge and skills to empower patients, in order to manage their own conditions. In the Expert Patient Programme, patients become key decision-makers in the treatment process and gain control over their lives through improved confidence, resourcefulness and self-efficacy (Department of Health, 2001). Evaluation of this type of disease self-management programme has shown them to be more effective than standard patient education in improving clinical outcomes, and enhancing physical and psychological well-being in chronic conditions such as arthritis and asthma (Bodenheimer, Lorig, Holman, & Grumbach, 2002). Lorig and others conclude that such programmes are effective because they increase patients' self-efficacy (Abraham & Gardner, 2009; Lorig & Holman, 2003).

Groupwork and empowerment

This work on disease self-management suggests that empowering patients to take control of their condition is key to improving outcomes. It has been suggested that the process of empowerment demands a very different style of groupwork than the process of education that it is replacing (Anderson & Funnell, 2005). Fundamental to this new approach is acceptance that communicating information about an issue and the benefits of change may be part of an effective intervention, but that they are not enough on their

179

own to change behaviour. If patients have information needs, then they have to be encouraged to identify these themselves. To empower them to manage their own illness and solve their own problems, they need to be supported in defining and achieving their own goals rather than those of the professional. In practice, this means encouraging patients to reflect, problem-solve and set goals, and to use the group for support and encouragement. The success of this type of groupwork is reflected in changes in the self-management behaviour of newly-diagnosed diabetics, including improved quality of diet, and reduction in body mass and total cholesterol (Arundel, Cradock, Noeken, & Skinner, 2003).

The skills of reflection, problem-solving, and goal-setting that are key to this approach are all recognized behaviour change techniques known to encourage self-efficacy (Michie, Johnston, Francis, Hardeman, & Eccles, 2008). Embedding training in these skills has been shown to be successful in improving the health behaviours of people with chronic disease. A recent King's Fund systematic review examined the content and effectiveness of interventions targeted at changing health behaviours in low-income groups (Michie, Jochekson, Markham, & Bridle, 2009). The authors concluded that providing information on health behaviours, together with goal-setting, may be effective in changing health behaviour in low-income groups. Our own review suggested that providing information on the risks and benefits of particular health behaviours is most likely to be effective, particularly if continued support is provided after the initial intervention (Baird, Cooper, Margetts, Barker, & Inskip, 2009) Our intervention builds on these findings but also takes from the empowerment model, which accepts that knowledge is not sufficient to change behaviour. Although this model has been shown to significantly improve outcomes in clinical populations, our intervention applies it to a general population in a community setting. It is designed to improve disadvantaged young women's sense of self-efficacy and control, both general and specific to health behaviours, and will do this by increasing the self-efficacy and behaviour change skills of the staff who work with these women.

Setting for the intervention

Southampton is a relatively deprived city in the affluent south of the country. It is one of the top 100 most deprived local authorities in England. We have developed strong links with the City Council and the Primary Care Trust (PCT) and collaborate closely with those working in Children's Centres in Southampton. Without this level of engagement, it would have been impossible to mount the intervention.

The majority of activities aimed at improving the diets and physical activity levels of young women living in disadvantaged areas of Southampton are delivered by Sure Start Children's Centres. These centres (formally Sure Start Local Programmes) provide a range of support services to families from disadvantaged and low-income populations, with the expressed aim of enhancing the health and development of children under five years, and so preventing the transmission of inequalities in health, poverty and social exclusion (Belsky et al., 2006). There are 14 such centres in Southampton, with the 'core' centres located in the most disadvantaged parts of the city identified as priority areas for intervention. These areas host the earliest and largest purpose-built Children's Centres in Southampton.

Mapping and observation of activities being delivered by Sure Start staff found that some use approaches which, research suggests, might be effective in changing health behaviours (unpublished data obtained from Sure Start management in Southampton). However, few of these activities were being evaluated and it was clear that many opportunities to address issues with diet and physical activity were being missed. We used an existing taxonomy of behaviour change techniques to classify the content of activities that supported women to change their diet and physical activity behaviour (Abraham & Michie, 2008). Although staff appeared to be highly motivated and skilled at engaging the women, we found them to be largely unaware of what might be most effective in bringing about behaviour change, and there was rarely discussion of current healthy eating or exercise recommendations. As a consequence, the observers concluded that:

1. there was potential to introduce Sure Start Children's Centre staff to a range of techniques proven to be effective in motivating, encouraging, and sustaining positive behaviour change;
2. they could benefit from learning strategies for discussing and problem-solving on issues to do with following healthy eating and exercise recommendations; and
3. encouraging staff to reflect on what is being delivered, and why and how it might make a difference, would be a useful starting point.

Disadvantaged women in Southampton

The target population for the intervention we describe here is women who attend the 14 Sure Start Children's Centres in the city of Southampton. Local Sure Start data suggest that 70 percent of the city's children under the age of five are registered with a Children's Centre. These children tend to come from families living in the 'core areas' defined by their poor health profile as being priority areas for intervention (Wilkinson & Inskip, 2006). Little is known about the 30 percent of children not registered; however, this group is likely to include some of the least advantaged children in the city, commonly described as the 'hardest-to-reach' because they come from families and communities who do not access services as a rule. There is anecdotal evidence that the activities of Sure Start in Southampton have reduced the size of the hard-to-reach population through a successful programme of outreach into these communities. Nevertheless, engaging disadvantaged communities in interventions is difficult (Parliamentary Office of Science and Technology, 2007), and Sure Start Children's Centres successes would not be possible without years spent building relationships in local communities. For this reason, they represent an ideal way for us to access and influence our target population. As our observation of Sure Start Children's Centre activities revealed, many of the staff have frequent contact with women from our target population, and these contacts represent opportunities to have interactions that might initiate a process of behaviour change. These interactions could be made more effective if staff had more skills at their disposal. As a consequence, it was decided to mount a training intervention to improve the behaviour change skills of staff working in Sure Start Children's Centres, with the intention of improving the diets and physical activity levels of disadvantaged women in Southampton.

Evidence of effectiveness of behaviour change programmes with low-income populations, our observations on current practice within Children's Centres, evidence of the barriers to health behaviour change among women in the intervention areas, and the views of PCT and Children's Centre staff, all form the basis for our training intervention. The intervention outlined in this article focuses on staff training to ensure sustainability, and has been developed in close collaboration with Southampton City PCT and the City Council.

Table 1. Competencies for trained staff

As a result of this training, I am able to:	• Use open discovery questions in a manner that helps others explore and reflect on what they do, why they do it and whether there is potential for change • Identify key (timely) opportunities for the use of healthy conversation strategies • Reflect on my own practice in relation to both my beliefs regarding key messages and ability to engage women and families in 'healthy conversations' • Spend more time in a conversation asking open discovery questions rather than giving information • Use a structured, goal-setting approach (incorporating SMARTER action planning) when the woman I am talking to has identified a need to change

The intervention

'Healthy conversation skills' training

The intervention involves training Children's Centre staff in skills that will enable them to hold effective 'healthy conversations' with women attending Children's Centres, and thus improve the self-efficacy and perceived control of both staff and women. These conversations are intended to explore barriers to, and opportunities for, eating healthily and being physically active. The first phase of the training intervention is nine hours of discussion and reflection in three sessions, each lasting three hours and spread over five weeks. The aim of the training is for staff to achieve the 'Healthy Conversation Skills' competencies described in Table 1. These competencies are designed to reflect the trainees' development of three core skills: reflective practice, asking 'open discovery' questions, and goal-setting.

We provide a range of activities to encourage reflection. Participants are asked to explore their expectations of the training course, their beliefs about aspects of human behaviour such as how and

181

when people change, their understanding of key nutrition and physical activity messages, and whether these are useful in supporting change. Opportunities are provided throughout all the sessions for participants to reflect on current practice, the training, new learning and their use of new skills in between the sessions.

All activities, including those encouraging reflection, require the facilitators to model the use of open discovery questions, which are specific types of open questions that explore an individual's life and circumstances, and are asked in order to support change. These questions normally begin with 'how' or 'what', are non-judgemental, and require the recipient to reflect on their issue of concern. As well as modelling their use, participants are given the opportunity to observe their use and practise using them in small groups.

At the end of every session, participants are asked to complete a 'Reflection and Next Steps' sheet, which guides them through setting a 'SMARTER' goal for review at the next session. SMARTER goals are Specific, Measurable, Action-oriented, Realistic, Timed, Evaluated and Reviewed. Making a specific plan to change a given behaviour, and allowing time to reflect on the outcome and processes involved in making such a change, enables participants to understand the process of planning and change.

Training is delivered by a team of psychologists and health practitioners experienced in groupwork and behaviour change. Each session is led by one or two facilitators and includes a range of activities. Groups consist of four to 12 participants, and depending on the size of the group, different activities are undertaken by the whole group, in two groups, in groups of three to four, or in pairs. A detailed account of the background and content of the training and the evaluation tools are given in the training manual and participants' workbook.[1] Outlines of the content of each of the three training sessions are provided in Table 2.

Facilitators abide by three guiding principles:

modelling – using the skills they want to see in others;
exploring – finding out about another person's worldview, being genuinely curious;
empowerment – believing in others' ability to come up with their own solutions.

Abraham and Michie's (2008) Behaviour Change Taxonomy was used by the training team to identify the different techniques used to influence healthy conversation skills competencies. Table 2 indicates how the behaviour change techniques (BCTs) classified and described in the taxonomy relate to the activities undertaken during the training sessions. For example, in using the 'Reflection and Next Step' sheets in their workbooks, participants make a plan for change between sessions, which is reviewed at the start of the next session. This process involves the following behaviour change techniques:

prompt intention formation;
prompt barrier identification;
prompt specific goal-setting;
prompt review of behavioural goals;
prompt self-monitoring of behaviour;
provide feedback on performance;
agree on behavioural contract;
prompt practice;
provide opportunities for social comparison; and
plan social support or social change.

In exploring what resources or support participants need now to ensure that new skills become embedded in their usual practice, the following BCTs are used:

prompt intention formation;
prompt barrier identification;
prompt practice;
plan social support or social change;
prompt identification as role model;
relapse prevention; and
time management.

This approach has the potential to increase participants' skills in all five of the competencies.

Some BCTs were not appropriate to use in this intervention because they do not fit with the non-didactic ethos of this intervention. For example, some information is provided in the participant workbook on the link between behaviour and health (BCT 1) and on the consequences of changing health behaviours (BCT 2). However, during the sessions facilitators seek to explore participants' own beliefs and understanding about these issues rather than merely providing information.

The three training sessions are followed by a follow-up telephone call approximately one month after session three, a follow-up workshop of three hours approximately three months after session three, and another phone call a month after the follow-up workshop. Follow-up phone calls are made to each training participant at pre-arranged times using a standard protocol and are digitally recorded.

Table 2. Outline of content of training sessions including behaviour change techniques (BCTs) used in each activity

Session 1	Session 2	Session 3	Follow-up workshop
Welcome and introductions (*BCTs 19, 9 'used throughout the three sessions)*	1 Review of changing a health behaviour (*BCTs 5, 11, 13*)	1 Review experiences of practising new skills (*BCTs 5, 11, 13*)	Reflection on experience of practising 'healthy conversations' (*BCTs 5, 11, 13*)
1 Our beliefs and participants' expectations of the training	2 Having a discussion – talker, listener, observer (*BCT 17*)	2 Creating opportunities for 'healthy conversations' (*BCTs 5, 15, 17*)	Completion and review of Healthy Conversation Scale (*BCT 5*)
2 Nutrition and physical activity key messages – explore participants' beliefs (*BCT 5*)	3 Developing better responses – open discovery questions Role-play – facilitator and 1 participant have a 'healthy conversation' (*BCT 17*)	3 Real play – 2 participants have a 'healthy conversation' (*BCT 17*)	Peer observation work Watch a video example Observe each other, complete observation sheets and plan how to use peer observations (*BCTs 4, 5, 17, 20*)
3 Exploring beliefs about people	4 Having a different discussion – listening and using open discovery questions (*BCT 17, BCT 10*)	4 Embedding new skills into practice – SMARTER goal-setting (*BCTs ,4 5, 10, 16, 17*)	Giving constructive feedback (*BCT 13*)
4 Reflection on session, including role-play where facilitators model two conversation styles	5 Reflection on session	5 What do participants need now? Designing resources and support (*BCTs 4, 5, 20, 21, 23, 26*)	Reminder of SMARTER goal-setting
5 Changing a health behaviour – SMARTER goal-setting (*BCTs 4, 5, 10, 16, 17*)	6 Practising new skills – SMARTER goal-setting (*BCTs 4, 5, 10, 16, 17*)	6 Reflect on expectations at beginning of course (*BCTs 4, BCT 5*) Set dates for follow-up	

Note: Numbers next to BCTs refer to the numbers given in Abraham & Michie (2008)
Behaviour change techniques key:

4 prompt intention formation	16 agree on behavioural contract
5 prompt barrier identification	17 prompt practice
9 model/demonstrate the behaviour	19 provide opportunity for social comparison
10 prompt specific goal setting	20 plan social support/social change
11 prompt review of behavioural goals	21 prompt identification as role model/ position advocate
13 provide feedback on performance	23 relapse prevention
15 teach to use prompts/cues	26 time management

Participants are asked to recall an example of a conversation they have had, telling the story of the scenario. The facilitator has a range of prompts that can be used if required. The purpose of the follow-up phone calls is twofold. First, they support the implementation of new skills into practice. Talking about the skills they learned, opportunities to use them, and thinking about how to get round any barriers to using them helps to embed new practice and encourages participants to use the skills at every opportunity. Second, the phone calls enable the collection of evaluation data about the changes that people have made to their conversations with women attending Sure Start facilities since the training.

The purpose of the follow-up workshop is to enable participants to reflect on the training, and whether and how their practice has changed in the intervening time. They are introduced to the idea of peer observation and feedback as a method of sustaining and improving use of the new skills for both observer and observed. The use of peer observation and feedback is based on four beliefs, that:

1. workers need to practise new skills to develop them;
2. observation by others can help a person think about what they do, and what they could do differently;
3. it helps both the person being observed and the observer to think about how they are using new skills; and
4. the observer does not need to be an expert in the skills being observed.

183

Table 3. Numbers of staff from each group who had been trained, or who had signed-up for training, as of December 2009

staff Staff group	Number of staff trained or signed up for training	Total numbers of in each group
Play and development workers and play supervisors	65	72
Community development workers	17	21
Nursery nurses and sessional nursery workers	10	26
Family support workers and coordinators	8	23
Administrative staff	5	19
(Senior) project support workers	5	7
Oral health/dental therapists	3	7
Others (including Sure Start coordinators, community health nurses, employment and training advisers)	7	10
Total	120	185

The follow-up workshop also provides an opportunity for participants to plan how to further embed healthy conversation skills in their everyday practice. It is followed a month later by the second of the two follow-up phone calls.

Table 3 describes the numbers of staff from each staff group employed by or affiliated to Sure Start in Southampton who had been trained, or who were in the process of being trained, as of December 2009.

All staff groups working within Children's Centres are being offered training. The managers of some staff groups have chosen to make the training mandatory, while others have not. This is reflected in the higher proportions of playworkers and community development workers receiving training. Overall, these figures indicate that about two-thirds (64%) of all Sure Start Children's Centre staff will have received training in healthy conversation skills by the end of the intervention.

Evaluation

The intervention is expected to have an impact at two levels: first, on Sure Start Children's Centre staff practice, and second, on the diet and physical activity levels of women attending Children's Centres. Therefore, the evaluation takes two forms. Staff practice and use of behaviour change skills are being assessed before, during, and after training, and through a period of follow-up. Changes in women's diet and physical activity levels are being assessed using a before and after non-randomized controlled trial to evaluate the intervention's effectiveness and cost-effectiveness over a two-year follow-up period.

Evaluating change in staff practice

In our intervention, demonstrating change in staff practice is a necessary precursor to improving diets and increasing physical activity levels in young women. For this reason, we have an extensive set of qualitative and quantitative measures to assess the reach of the training, the changes in both practice and attitudes to these changes, changes in competence and staff knowledge. The evaluation of change in staff practice is based on the Kirkpatrick Evaluation Model, a widely used model describing four levels of evaluation specifically adapted for the evaluation of training programmes (Kirkpatrick, 1998). Therefore, we are assessing:

1. reaction – the initial response from staff participating;
2. learning – their knowledge of the new skills in which they are being trained;
3. behaviour – their use of the new skills in practice; and
4. whether the new skills actually change behaviour in the women they work with at Children's Centres.

We are monitoring staff uptake and use of training, and their views on the acceptability of training through observation of practice and using focus groups. As a part of monitoring the process of mounting the intervention, we are recording all aspects in order to ensure reproducibility and sustainability. Evaluation of the impact of training on staff practice is carried out at a number of time points. The process is described on the timeline given in Fig. 1.
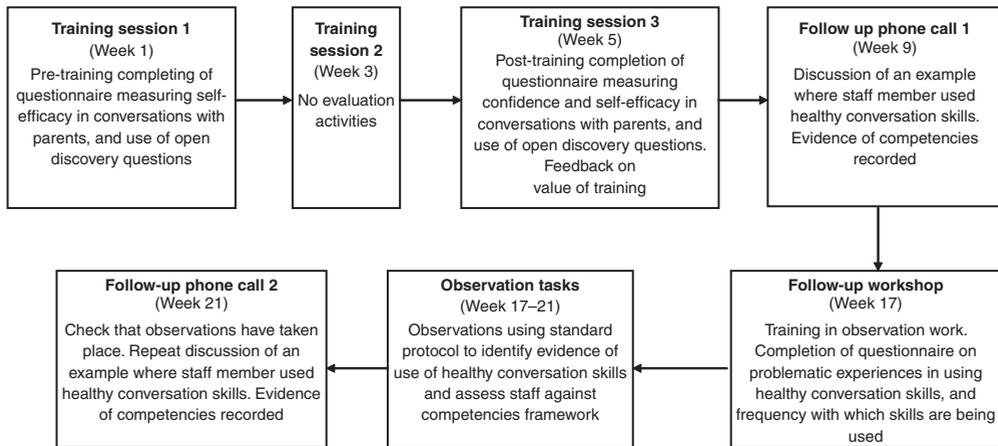
184

| Training session 1 (Week 1) Pre-training completing of questionnaire measuring self-efficacy in conversations with parents, and use of open discovery questions | → | Training session 2 (Week 3) No evaluation activities | → | Training session 3 (Week 5) Post-training completion of questionnaire measuring confidence and self-efficacy in conversations with parents, and use of open discovery questions. Feedback on value of training | → | Follow up phone call 1 (Week 9) Discussion of an example where staff member used healthy conversation skills. Evidence of competencies recorded |

| Follow-up phone call 2 (Week 21) Check that observations have taken place. Repeat discussion of an example where staff member used healthy conversation skills. Evidence of competencies recorded | ← | Observation tasks (Week 17–21) Observations using standard protocol to identify evidence of use of healthy conversation skills and assess staff against competencies framework | ← | Follow-up workshop (Week 17) Training in observation work. Completion of questionnaire on problematic experiences in using healthy conversation skills, and frequency with which skills are being used |

Figure 1. Timeline describing each stage in the process of evaluating the impact of training on staff practice

Staff self-efficacy and use of open discovery questions

Before they begin the first training session, staff are asked to complete a short questionnaire comprising five questions, asking them to rate on scales of 1 to 10 how confident they feel about having conversations with parents about eating healthily and being physically active, and how important and useful they think these conversations are. These questions are intended to reflect staff self-efficacy in talking to parents about diet and physical activity and their attitudes to having these conversations. In addition, they are asked to write down responses to four statements (given in Table 4) about the difficulties of changing patterns of diet and exercise, all of which have come directly from conversations with women in Southampton.

Responses are coded into one of six categories that were generated by two members of the research team double-coding data from the pilot workshops. The categories of responses used are: (1) 'closed question', (2) 'open discovery question', (3) ' other open question', (4) 'in my experience', (5) 'telling or suggesting', and (6) 'empathy or reflection'. These codes reflect differences in style of response: didactic and information-giving (categories 1, 4, and 5) as opposed to exploratory and supportive (categories 2, 3, and 6). Empathy on the part of the practitioner is important, but is not the focus of this training. Staff are asked to complete this questionnaire again at the end of the third and last training session, usually five weeks after the first; in addition,

Table 4. Four statements made by women attending Sure Start Children's Centres

Training participants are asked for their responses to these statements before and after training

Statement	Response
1. 'There are lovely vegetables outside the shops, but I don't know what they are.'	
2. 'I can't afford for us to join a gym.'	
3. 'It's more about never being taught what to eat, cook or whatever.'	
4. 'I just don't seem to have time to do any exercise.'	

they are asked whether they feel more or less confident about having conversations with parents since the beginning of the training. Seeing any change in levels of confidence between the two time points is an indication that the training is having an effect on staff self-efficacy, although we might expect staff to lose confidence as they become aware that their current practice might not be effective, and before they feel skilled in using healthy conversation skills. Their written responses to the four statements are coded using the same categories as at the end of the first session. If the training is being effective in helping staff to see the value of using more open discovery questions in empowering behaviour

185

change, then we would expect to see more being asked at this time point. This would be described on Kirkpatrick's scale as level 2: evaluation of staff learning. Early results from this evaluation exercise suggest that after three training sessions, staff have learned how to respond in theory to statements by parents about diet and physical activity by using an open discovery question.[2]

At the end of the third training session, we also ask staff to answer three questions to give feedback about their experience of the training course. This is an evaluation at level 1.

Using new behaviour change skills

Staff knowledge and use of behaviour change skills in practice, a level 3 evaluation in Kirkpatrick's schema, is assessed against five competencies set out in Table 1. These reflect the key skills that the training is intended to communicate and the ability of staff to recognize opportunities to use these skills. These are assessed by the research team during the follow-up phone calls held with each staff member a month after the last training session, and again a month after the follow-up workshop, also as part of an observation task carried out some months after completion of training. Follow-up phone calls are recorded and transcribed. Transcripts are then coded independently by two of the research team for evidence that the member of staff has used any of the five competencies given in Table 1, and rates how well they had done this against a pre-defined rubric.

We are also recording barriers in using healthy conversation skills using a modified version of Yardley's Problematic Experiences of Therapy Scale (Yardley & Kirby, 2006). Staff are asked to complete this at the follow-up workshop. The questionnaire asks them about the acceptability of using healthy conversation skills in their workplaces, difficulties in using the skills, and practical issues which may have prevented them from applying the skills. At the same time, staff are asked whether and how often they manage to use their healthy conversation skills. Because we know where each staff member is based, we will be able to use this as an indication of how much women attending the Sure Start Children's Centres are being exposed to healthy conversation skills.

At the follow-up workshop, participants explore how they might proceed with an observation task to provide more evidence as to whether healthy conversation skills are being used in practice. Some months after completion of training, either a pair of trainees arranges to observe one another in carrying out a

healthy conversation, or a member of the research team observes a sample of trained staff carrying out healthy conversations at the Children's Centre. In either event, the process is similar. During the observation, use of open discovery questions and SMARTER planning is recorded. After the conversation, the observer notes how the staff member identified the opportunity for the conversation, makes brief notes about the situation and conversation, indicates how much time the women spent talking relative to the staff member, and how much time was spent asking open discovery questions. All this is recorded on a short proforma designed for the purpose. In addition, the observer is asked to provide the staff member with some very brief feedback notes.

We are planning a comparison between staff practice in Southampton Sure Start Children's Centres with staff practice in a control area. This will probably take the form of a survey that will assess staff knowledge of effective BCTs and key nutrition and physical activity messages. We expect to conduct this survey six months after the training intervention has been completed.

Evaluation of impact on young women's diets and physical activity levels

The level 4 evaluation, as defined by Kirkpatrick, is to assess the impact of healthy conversation skills training of Sure Start Children's Centre staff on the diets and physical activity levels of the population that they serve. We are using a before and after non-randomized controlled trial to evaluate the effectiveness and cost-effectiveness of the training in changing diet and physical activity levels over a two-year follow-up period. We carried out a cross-sectional survey of 500 women at baseline in the intervention and control areas, and will be repeating this at 18 months, and hope to do so at two years. We aim to follow up a cohort of 300 of these women to assess longitudinal changes in diet, physical activity and well-being. This type of design, which uses a combination of cross-sectional and cohort studies to measure population and individual-level changes, has been used in the evaluation of cardiovascular programmes such as Heartbeat Wales (Tudor-Smith, Nutbeam, Moore, & Catford, 1998). Although we had originally intended to randomize individual Children's Centres within Southampton to intervention or control conditions, we discovered that there was too much staff movement between centres for them to be considered discrete units. Therefore, we

Table 5. Basic demographic characteristics of women interviewed at baseline in Southampton and in Gosport and Havant

	Southampton (N = 527)	Gosport and Havant (N = 495)
Mean age, years	30	30
Ethnicity	90% white	99% white
Median no. of children in household	2	2
Educational qualifications up to GCSE level	41%	43%
Being in receipt of benefits	45%	44%
Working in the previous seven days	23%	29%

are comparing outcomes in women across the whole of Southampton with those in a control group of women attending Children's Centres in Gosport and Havant, which are areas with very similar demographic features to Southampton. Sociodemographic information about the women in the study is being collected at baseline, so that we will be able to adjust for differences at baseline in our analyses. Table 5 gives basic demographic information for the women interviewed in the control area and women interviewed in the intervention area. The table shows the two groups to be similar in most characteristics.

Our main outcomes are being assessed using validated questionnaires. Diet is assessed using a food frequency questionnaire developed by the Medical Research Council Epidemiology Resource Centre and validated as a measure of dietary quality with women of childbearing age. Data from the food frequency questionnaire will be used to produce a score that reflects dietary quality using methods developed as part of the Southampton Women's Survey (Crozier et al., 2009). Physical activity is being assessed using the General Practice Physical Activity Questionnaire (National Institute for Health and Clinical Excellence, 2006): this was chosen following pilot studies of the General Practice Physical Activity Questionnaire, International Physical Activity Questionnaire (Craig et al., 2003) and the Recent Physical Activity Questionnaire (Besson, Brage, Jakes, Ekelund, & Wareham, 2010), which demonstrated that the General Practice Physical Activity Questionnaire had the best face validity for this population. Further, we are measuring levels of self-efficacy and perceived control in the women using validated instruments (Bobak, Pikhart, Rose, Hertzman, & Marmot, 2000; Schwarzer & Jerusalem, 1995). Responses relating to women's self-efficacy and perceptions of control will enable us to assess changes in the barriers to health behaviour change.

We would expect to see increases in general self-efficacy and specific self-efficacy for eating healthily and exercising if our intervention is being effective, as we also expect to see improvements in diet and physical activity levels. There will be qualitative follow-up including focus group discussions with the women in the cohort, in order to explore their attitudes and beliefs about diet and physical activity, and to discuss any changes that they may have made to these behaviours. In order to avoid confounding of our findings by experimental effects, we will be running focus groups in the control areas. In addition, we are intending to ask the women attending Sure Start Children's Centres for their views on the nutrition, physical activity, and well-being advice and projects that they have received from Sure Start Children's Centre staff in order to assess acceptability. Again, we plan to do this through focus group discussions.

One advantage of our intervention is that it is at one remove from the population whose behaviour we are attempting to change. As a consequence, women in Southampton are largely unaware that they are part of an intervention to change their health behaviour. This is helpful in excluding experimental effects that are known to confound effects of public health interventions (Hardeman, Kinmonth, Michie, Sutton, & the ProActive Project Team, 2009). The difficulty of this approach is in assessing its impact. The diffuse nature of the intervention means that it will be difficult to attribute to it any changes seen in women's diets and physical activity levels.

We will record the frequency with which women have attended Children's Centre activities during follow-up in order to identify any dose–response relationship between the intervention and behaviour change. We will use a validated questionnaire to collect information about the extent to which participants feel they have been able to change their diet

187

and physical activity, and if they have been unable, the reasons why (Yardley and Kirkby, 2006).

Cost-effectiveness

Costs will be assessed in terms of cost-per-unit change in quality of diet score, or physical activity level in a subset of women who change their health behaviour by at least the anticipated level (as defined in power calculations for primary outcomes), using questionnaires and interviews. This approach will generate insight into processes of behaviour change as well as avoid questioning large numbers of women whose behaviour has not changed. There will be three elements to the assessment: cost of the intervention; costs incurred by any changes in food expenditure and participation in physical activity; and notional costs of increases in time spent preparing food or taking part in physical activity.

Mapping of environmental influences on diet and physical activity

In order to address issues of confounding by changes coinciding with the intervention, we are mapping changes in the food and physical activity environments (e.g. supermarkets, leisure centres) of the women in the intervention and control areas at baseline, 18 months and two years. We will take account of any environmental changes in our analyses. During the baseline, 18-month and two-year surveys we have asked, and will ask, the women to describe the locations where they work, where they do most of their shopping, and where they take physical activity. This information will enable us to direct our mapping work appropriately. In addition, we are monitoring policy and practice changes as they affect the work of Sure Start Children's Centres.

Planned statistical analyses

A sample size of 500 at baseline, 18 months and 2 year follow-up will give 90 percent power to detect a difference of SD = 0.2 in the main outcomes between women in the intervention and control groups. Allowing for a correlation of 0.75 between individual women's results before and after the intervention, at a 5 percent significance level, a sample size of 200 in the cohort at baseline, 18 months and 2 years will give 80 percent power to detect a change of SD = 0.2 in dietary quality score between baseline and follow-up, and 80 percent power to detect a SD = 0.275 difference in the change in outcome.

Analysis of data from the cross-sectional surveys will identify population changes in diet, physical activity and psychosocial factors, whereas analysis of data from the cohort will identify longitudinal changes in these outcomes. We will compare dietary quality scores, physical activity levels and scores on scales measuring the psychosocial variables of the women in the intervention and control groups at baseline, 18 months and two years using t-tests. Changes in outcomes over time in the cohort will be assessed using paired t-tests. We will control for the influence of confounding factors using multivariate regression modelling. Cost-effectiveness will be assessed in terms of cost-per-unit change in quality of diet score or physical activity level. Focus group data will be analysed thematically using constant comparative methods and coded according to emerging themes.

Conclusion

The design of this training intervention was based on research that has identified Sure Start Children's Centres and their staff as key supports to women of disadvantage in Southampton. We have completed the development phase of the work, as specified by the Medical Research Council guidelines for developing and evaluating complex interventions, and are simultaneously piloting and evaluating the effectiveness of the intervention (Craig et al., 2008). Our innovation is in applying an approach known to be effective in improving health behaviours in clinical populations to a target group within the general population. The advantage of a staff training intervention over a programme that works directly with our target population is that it is likely to be more efficient and more sustainable to enhance existing resources than to put in additional resources. We are not asking staff to undertake any new activities, but are equipping them with skills to make their existing activities more effective in supporting behaviour change in the people with whom they work. Our early data suggest that we are being effective in this. City Council and PCT staff in Southampton have been very engaged in this initiative. One of the aims of our ongoing support of staff is to develop 'champions': staff members who will take on the training of new staff in healthy conversation skills. This is key to the sustainability of the intervention and will be an important part of our work going forward.

Notes

1. The training manual and participant workbook are available from the authors on request.
2. Data from this phase of the evaluation will be available for publication in autumn 2010.

References

Abraham, C., & Gardner, B. (2009). What psychological and behaviour changes are initiated by 'expert patient' training and what training techniques are most helpful? *Psychology and Health, 24,* 1153–1165.

Abraham, C., & Michie, S. (2008). A taxonomy of behaviour change techniques used in interventions. *Health Psychology, 27,* 379–387.

Anderson, R. M., & Funnell, M. M. (2005). Patient empowerment: Reflections on the challenge of fostering the adoption of a new paradigm. *Patient Education and Counselling, 57,* 153–157.

Arundel, F., Cradock, S., Noeken, J., & Skinner, T. C. (2003). Phase 1 evaluation of Starting Out with Type II Diabetes: a self-management education workshop for the newly diagnosed. *Diabetic Medicine, 20,* 76.

Baird, J., Cooper, C., Margetts, B. M., Barker, M., & Inskip, H. (2009). Changing health behaviour of young women from disadvantaged backgrounds: Evidence from systematic reviews. *Proceedings of the Nutrition Society, 68,* 195–204.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1995). *Self-efficacy in Changing Societies*, 1st edn. Cambridge: Cambridge University Press.

Bandura, A. (1998). Health promotion from the perspective of social cognition theory. *Psychology and Health, 13,* 623–649.

Barker, M., Lawrence, W., Skinner, T. C., Haslam, C., Robinson, S. M., Barker, D. J. P., et al. (2008). Constraints on the food choices of women with lower educational attainment. *Public Health Nutrition, 11,* 1229–1237.

Barker, M., Lawrence, W., Crozier, S., Robinson, S., Baird, J., Margetts, B., et al. (2009). Educational attainment, perceived control and the quality of women's diets. *Appetite, 52,* 631–636.

Besson, H., Brage, S., Jakes, R. W., Ekelund , U., & Wareham, N. J. (2010). Estimating physical activity energy expenditure, sedentary time, and physical activity intensity by self-report in adults. *American Journal of Clinical Nutrition, 91*, 106–114.

Belsky, J., Melhuish, E., Barnes, J., Leyland, A. H., Romaniuk, H., & and National Evaluation of Sure Start Research Team (2006). Early effects of Sure Start local programmes on children and families: Early findings from a quasi-experimental, cross-sectional study. *British Medical Journal, 332,* 1476.

Bobak, M., Pikhart, H., Rose, R., Hertzman, C., & Marmot, M. (2000). Socioeconomic factors, material inequalities, and perceived control in self-rated health: Cross-sectional data from seven post-communist countries. *Social Science and Medicine, 51,* 1343–1350.

Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Journal of the American Medical Association, 288,* 2469–2475.

Craig, C. L., Marshall, A., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., et al. (2003). International Physical Activity Questionnaire: 12 country reliability and validity. *Medicine and Science in Sports and Exercise, 35,* 1381–1395.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: The Medical Research Council guidance. *British Medical Journal, 337,* a1655.

Crozier, S. R., Inskip, H. M., Barker, M. E., Lawrence, W. T., Cooper, C., & Robinson, S. M. (2009). Development of a 20-item food frequency questionnaire to assess a 'prudent' dietary pattern among young women in Southampton. *European Journal of Clinical Nutrition, 64,* 99–104.

Department of Health (2001). *The expert patient: a new approach to chronic disease management for the 21st century*. London: HMSO.

Hardeman, W., Kinmonth, A. L., Michie, S., Sutton, S., & ProActive Project Team (2009). Impact of a physical activity intervention program on cognitive predictors of behaviour among adults at risk of Type 2 diabetes (ProActive randomised controlled trial). *International Journal of Behavioral Nutrition and Physical Activity, 6,* 16–25.

Kirkpatrick, D. L. (1998). *Evaluating training programs: The four levels*, 2nd edn. San Francisco, CA: Berrett-Koehler Publishers.

Lawrence, W., Skinner, T. C., Haslam, C., Robinson, S., Inskip, H. M., Barker, D. J. P., et al. (2009). Why women of lower educational attainment struggle to make healthier food choices: The importance of psychological and social factors. *Psychology and Health, 24,* 1003–1020.

Lorig, K. R., & Holman, H. (2003). Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine, 26,* 1–7.

Luszcznska, A., & Haynes, C. (2009). Changing nutrition, physical activity and body weight among student nurses and midwives: Effects of a planning intervention and self-efficacy beliefs. *Journal of Health Psychology, 14,* 1075–1084.

Michie, S., Johnston, M., Francis, J., Hardeman, W., & Eccles, M. (2008). From theory to intervention: Mapping theoretically derived behavioural determinants to behaviour change techniques. *Applied Psychology: An International Review, 57,* 660–680.

Michie, S., Jochekson, K., Markham, W. A., & Bridle, C. (2009). Low-income groups and behaviour change interventions: A review of intervention content,

189

effectiveness and theoretical frameworks. *Journal of Epidemiology & Community Health, 63,* 610–622.

National Institute for Health and Clinical Excellence (2006). *Four commonly used methods to increase physical activity: Brief interventions in primary care, exercise referral schemes, pedometers and community-based programmes for walking and cycling*, Report. No. 2. London: National Institute for Health and Clinical Excellence.

Parliamentary Office of Science and Technology (2007). 'Postnote: Health Behaviour', report no. 283. London: Parliamentary Office of Science and Technology.

Robinson, S. M., Crozier, S. R., Borland, S. E., Hammond, J., Barker, D. J. P., & Inskip, H. M. (2004). Impact of educational attainment on the quality of young women's diets. *European Journal of Clinical Nutrition, 58,* 1174–1180.

Robinson, S., Marriot, L., Poole, J., Crozier, S., Borland, S., Lawrence, W., et al. (2007). Dietary patterns in infancy: The importance of maternal and family influences on feeding practices. *British Journal of Nutrition, 98,* 1029–1037.

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy Scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). Windsor: NFER-Nelson.

Skinner, T. C., Cradock, S., Arundel, F., & Graham, W. (2003). Four theories and a philosophy: Self-management education for individuals newly diagnosed with type 2 diabetes. *Diabetes Spectrum, 16,* 75–80.

Steptoe, A., Perkins-Porras, L., Rink, E., Hilton, S., & Cappucio, F. P. (2004). Psychological and social predictors of changes in fruit and vegetable consumption over 12 months following behavioural and nutrition education counseling. *Health Psychology, 23,* 574–581.

Tudor-Smith, C., Nutbeam, D., Moore, L., & Catford, J. (1998). Effects of the Heartbeat Wales programme over five years on behavioural risks for cardiovascular disease: Quasi-experimental comparison of results from Wales and a matched reference area. *British Medical Journal, 316,* 818–822.

Wilkinson, R., & Inskip, H. (2006). *The health and well-being of women in Southampton's communities: An analysis of the Southampton Women's Survey*, public health briefing note, Southampton City NHS Primary Care Trust, no. 3. http://www.southamptonhealth.nhs.uk/publichealth/briefings/ (accessed June 2, 2010).

Yardley, L., & Kirby, S. (2006). Evaluation of booklet-based self-management of symptoms in Menière's disease: a randomized controlled trial. *Psychosomatic Medicine*, *68*, 762–769.

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