

The use of behavioural change techniques in treatment of paediatric obesity: qualitative evaluation of parental perspectives on treatment.

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ABSTRACT

Background: Treatment for childhood obesity is characterised by patient non-attendance and widespread failure to achieve weight maintenance. The use of behavioural change methods are suggested for engaging families in changing lifestyles. Qualitative methods may improve our understanding of patient perceptions, so improving treatment. We set out to explore the thoughts and feelings of parents whose children had undertaken dietetic consultations either employing behavioural change techniques or delivered by dietitians with no formal training in these techniques.

Methods: We used purposive sampling and interviewed 17 parents of children attending 6-month outpatient treatments for obesity (BMI>98th percentile). Parent's perceptions of the dietetic treatment they received were explored by in-depth interviews, analysed using Framework methods.

Results: Parents who had taken part in the behavioural change techniques applauded the process finding it child-friendly and talked of 'forming a partnership' with the child and dietitian. Conversely standard care treatment was less well received. Developing a rapport with the dietitian was significant for the parents in their perception of a positive experience.

Conclusions: This study may help inform future treatments for childhood obesity by providing insights into the aspects of treatment and approaches applauded by parents. It highlights the possible value of the use of behavioural change skills by dietitians as a way of engaging with families of obese children.

INTRODUCTION

General Background

The epidemic of childhood and adolescent obesity in the UK and across the world is well documented (Lobstein et al. 2004; Reilly & Dorosty 1999). However, reproducible effective childhood weight management programmes still remain elusive (Collins et al. 2006; SIGN 2003). Qualitative research is a powerful tool for allowing participants to describe how the experience and programme felt from the inside (Patton 2002). The Health Development Agency 2003 report on weight management called for qualitative data on the thoughts and views of participants on interventions (Mulvihill & Quigley 2003). Reporting on dropout rates from their US paediatric obesity clinic Zeller et al called for qualitative research to look at the views of patients to established which aspects of the programme did or did not work and why so many families failed to complete treatment (Zeller et al. 2004). We set out to use in-depth interviews to explore the thoughts and feeling of parents on the dietetic treatments their child received for weight management.

The present qualitative study followed a recently completed randomised controlled trial (RCT) of dietetic interventions for childhood obesity in the UK known as the SCOTT project (Stewart et al. 2005). Children had been randomised to either dietetic care employing behavioural change techniques (novel treatment) or local 'typical' care delivered by dietitians with no formal training in motivational or behavioural change techniques (standard care). The purpose of this qualitative evaluation was to help us understand the parents' experiences and perceptions of their child's obesity treatment. In turn assisting in the design of dietetic treatments thus improving efficacy and patient adherence to therapy. Indeed, there are few qualitative studies on childhood obesity management and we intended that the present study would add to the emergent body of qualitative evidence on this subject. The NICE 2006 guideline on obesity in adults and children suggested that behavioural change approaches should be used in management of childhood obesity (NICE 2006). However the use of behavioural change techniques in paediatric obesity is relatively new and requires exploration (Resnicow et al 2006). Within this paper we set out to first describe the use of behavioural change

techniques by trained dietitians in a paediatric population and then to report our qualitative evaluation of two dietetic approaches (novel treatment involving behavioural change techniques and standard dietetic care) from the parents perspective.

METHODS

Overview of the novel dietetic programme

The novel treatment (NT) employed a number of behavioural change techniques (NICE 2006) and was delivered in a style based on motivational interviewing (Rollnick et al. 2005; Rollnick et al 1999). We refer to the approach taken in the novel treatment as using 'behavioural change interviewing techniques'. Lifestyle advice was aimed at changes in diet (using a traffic light diet scheme), (Epstein et al 1985; Stewart et al 2005) increasing physical activity levels and decreasing time spent in sedentary behaviours. The dietitians delivering the treatment had undertaken formal training in these techniques and a fuller description of our NT protocol is reported elsewhere (Stewart et al 2005).

Prior to starting the RCT a pilot study of the NT programme was undertaken with five families, these sessions were taped and independently assessed to ensure consistent use of interview techniques. At the end the parents and children completed together a semi-structured questionnaire (reproduced in table 1) on both the style and content of the sessions. Answers to this semi-structured questionnaire were subsequently used to triangulate with the results from the NT parents. During the RCT a number of interviews were taped and independently assessed by trained observers.

Behavioural change techniques

A number of core behavioural change techniques have been suggested for successfully managing lifestyle changes in children (Epstein et al. 1994; Lask 2003; NICE 2006; Robinson 1999; Stark 2003). These techniques help the client raise awareness of their current lifestyle, focus on the aspects of their lifestyles which require change and develop strategies to implement and monitor the changes. The behavioural change techniques incorporated into

the NT programme that are the subject of the present paper are briefly outlined in table 2.

Motivational interviewing

Motivational interviewing has been established, for adults, in many areas of lifestyle change for a number of years (Rollnick et al 1999). A fundamental principle is that the approach is client centred; **involving empowerment, and respecting the client's (the child's) voice, self-determination, and participation in decision-making.** The child sets their own goals for lifestyle change and those involved (the child, parent and dietitian) have a shared agenda for change, accepting and acknowledging that change is an on going process which occurs over a period of time (Lask 2003; Rollnick et al 1999; Stark 2003). Within this over-riding principle the dietitian guides the child to the necessary lifestyle changes in diet, physical activity and sedentary behaviours (Hunt & Pearson 2001; Rollnick et al 2005).

Underpinning the motivational interviewing are interpersonal skills and an understanding of the change process (Rollnick et al 1999). The dietitian establishes a 'helping' relationship with the child and provides them with a safe environment where they will be heard and understood; importantly that they have an opportunity to tell their story as well as gain information. To do this the dietitian employs active listening skills such as verbal following (also know as mirroring), minimal encouragers, paraphrasing and reflection (Hunt & Pearson 2001). Open questions of 'how', 'what', 'could you', 'can you' are used and 'why' questions are avoided. The dietitian should also use collaborative language such as 'we', 'us' and 'together' instead of 'you', summarising and clarifying before proceeding (Hunt & Pearson 2001).

A key component is exploring ambivalence to change, often done using a 'decisional balance chart' (Rollnick et al 1999). This decisional balance chart is used to discuss and record the child's 'good' reasons for changing and 'not so good' reasons for change. Importance of change can be examined by asking the child to give a number from 1 to 10 on how important it is for them to make changes. The dietitian needs to 'roll with the resistance' to change by

using reflective listening skills, shared decision making and agenda setting (Rollnick et al 2005; Rollnick et al 1999). In our novel treatment programme the child was given control of their lifestyle changes and no goals were imposed on them, however their goals were reviewed to ensure they are realistic and achievable (see table 2).

Table 3 summarises the qualities and skills required by a dietitian undertaking the NT programme as well as the principles and strategies employed.

Outline of standard dietetic care

The interview techniques used by the standard care (SC) dietitians are best described as following the expert medical model (Hunt 1995). Advice on lifestyle change concentrated on changing to a healthy diet (lower in fat and sugar) and touched on increasing physical activity. The number and length of interviews were standardised, and typically included 3-4 appointments over 10 months, the advice given and the structure within the interviews were based on the dietitian's own clinical experience. It was not unusual for dietitians in the same department to give varying advice and different structure within their sessions and no motivational or behavioural change tools were employed. The Scottish Nutrition and Diet Resource Initiative's 'The Right Choice' series including the goal sheet were used by all the dietitians.

After the completion of the intervention phase of the RCT the SC dietitians were asked to complete a structured questionnaire on the type of information they gave out during sessions and the manner in which interviews had been conducted.

Table 4 outlines the fundamental differences between the two dietetic treatments.

Qualitative Methodology

We used purposive sampling (Morse 1991) **with the following criteria**

- **Successful outcome / unsuccessful outcome of treatment**

- Age of child (5-8 years and 9-11 years)
- Location (Edinburgh/Glasgow)
- Gender of child
- Family situation e.g. two parents or single parent family, main carer not a parent

Of the 79 eligible families participating in the SCOTT study, 17 parents (1 from each family) consented to participate. The characteristics of these parents are discussed under results. The in-depth interviews took place 12 months after the start of treatment. The study received ethical approval from the Multi-centre research ethics committee for Scotland.

Taped interviews followed a topic guide with no set questions. Interviews were conducted by two of the authors (LS and JC) who were unknown to the parents, these lasted between 50 - 80 minutes. Recordings were fully transcribed and the 'Framework' method of content matrix data analysis was used (Ritchie & Spencer 1994). Both interviewers and VP developed the themes independently and then agreed principal themes and sub themes. The themes were coded using Nvivo software (QSR International Pty Ltd).

Peer consultation took place with all authors on coding of the transcripts, charting and mapping data, and final interpretations. This was important to help counter any bias that may have emerged during data interpretation. To ensure a transparent audit trail all the audiotapes, paperwork, Nvivo coding, charts and mappings are available for review.

RESULTS

Participant characteristics

Of the seventeen principal carers of children aged 5-11 years 14 were mothers, two fathers and one a grandmother from diverse backgrounds and family circumstances. The characteristics of participating families in the present study (see table 5) were similar to those children referred for obesity

management to the two major paediatric centres in Scotland (Stewart et al 2004).

Standard care dietitians

Eight dietitians from three dietetic departments undertook the standard care, 7 returned the post study questionnaire. None reported changing their usual care during this period and we are confident that the description of the SC given above and outlined in table 4 was typical of the dietetic intervention delivered.

Novel care dietitians

The interviews taped during the pilot study and the RCT were transcribed and the assessment scored out of 7 by independent assessors. The NT dietitians scored; 5-6 for patient-centeredness; 6-7 empathy, genuineness, acceptance; 5-6 client responsibility, social influence, collaboration; 5-7 affirmation; and 4-7 for pace of interviews. Concluding that both dietitians undertaking the NT programme were highly skilled in these techniques.

Parent perceptions of dietetic care

Throughout this paper anonymised verbatim quotes are used to illustrate and support the arguments, interpretations and tentative conclusions put forward. Notations; NT = novel treatment parent; SC = standard care parents; 1 = child's BMI decreased; 2 = child's BMI increased.

Interviewing techniques

Goal setting and rewards

NT parents talked about the use of goal setting and rewards in a very positive light. These parents persistently reported that the use of goals had motivated and encouraged their child to make and continue with lifestyle changes. There was a widespread feeling that the children seemed to enjoy setting and keeping to their goals and these helped with self-esteem, *'children are more aware nowadays, none of us like being told to do things and so it was like forming a partnership and it worked'* (NT2). Parents felt that when children had not met all their goals they had been truthful about this with the dietitian.

Agreed written goals were felt to have stopped arguments at home, *'a lot of the time it was just down to the fact that this is what we have to do end of story'* (NT1). Consistently parents felt that their child had set their own goals and the dietitian had ensured that the goals had been realistic. After the programme families continued with goal setting/rewards to differing degrees, those who had stopped generally talked about returning to goal setting.

There was an overwhelming feeling among SC parents that they had not received goals or targets for change by the dietitian. Less typically parents had set goals themselves at home after the appointments, *'we did when we got home, we went through sheets and things and then we would sit down and take away this and added that'* (SC1).

Self-monitoring of lifestyle changes

NT parents repeatedly noted that although they found recording lifestyle burdensome they felt that self monitoring had increased the child's and parent's awareness of their lifestyle and necessary changes. There was a feeling that it was especially helpful at the start of the programme, *'I was happy for C to watch TV but I wasn't aware of how much TV she was actually watching but when we were recording it I was really surprised. I just wasn't aware of things that is why recording was so good'* (NT1). There was a strong feeling that keeping these records had helped with compliance to the goals. There was continued but not widespread use of self-monitoring after the programme had ended.

The SC families generally could not recall being asked to self-monitor lifestyle, a few felt they may have been asked but none remembered doing it. There was however a feeling that parents were more aware of the types of foods they were giving their children e.g. in lunch boxes.

Responsibility for lifestyle changes

There was a widespread sense among the NT parents that they had an overseeing role in encouraging but not controlling their child to keep to their goals and lifestyle changes, *'if she has a treat of chocolate it will be through*

the day, she has to decide, she has to tell me' (NT1). When the child's motivation was waning they reported giving gentle reminders and encouragement. The SC parents generally appeared to have a dictatorial role, they controlled and monitored the child's food intake with the child taking no responsibility, *'if she wants coke she is told she is not getting coke and if she wants chips she is told that she is not getting chips, she is lucky to get nuggets and is told that'* (SC1). This encouraging role of NT parents and the controlling role of SC parents were expressed regardless of the child's weight outcome.

NT parents repeatedly commented that they had noticed an increase in their child's awareness of their own lifestyle, their need to make on going changes and about the family's commitment to lifestyle changes. Furthermore, parents consistently reported that they had observed improvements in the child's self-esteem/confidence, this was generally discussed in terms of styles of clothes they could now wear, enjoying taking part in PE, *'she used to be embarrassed at school cause there were things she couldn't do in PE that she can now do, I mean she couldn't do forward rolls and it really upset her'* (NT1). The SC parents did not talk of awareness in their child of appropriate lifestyle changes and less typically commented on family commitment to changes.

Treatment approaches and dietitian's attitude

A recurring view from the SC group was that the sessions were not as child-focused or friendly as they had hoped, with repeatedly voiced suggestions that the information should be more accessible to children. Suggestions included group sessions, using good and bad foods, discussing portion sizes, children's games to help with education, more appointments and continuity with the dietitian seen. The SC group also expressed negative experiences of both the clinics and the dietitians, *'I don't really think it was a success 'cause I don't think we both actually like the dietitian, em. I think that wasn't me, he didn't like her'* (SC2). Although less typical these strongly held feelings were expressed as dissatisfaction with treatment, a sense that not enough help was given, that they had expected more education (for themselves and their child), *'I am not sure what the right answers are I really don't I just feel there is not*

enough being done for her' (SC2) and 'by the time we got to the fourth one I really felt that we were going over old ground and there was nothing new coming out of it' (SC2).

The NT parents overwhelmingly felt that the programme had been child-friendly and child-focused, *'oh fantastic really, you know just that control. I thought we would have a real problem and we probably would have problems with our younger daughter but she has been taken on board too and it has given us a focus it has given me a direction to go in if I think things are a bit you know' (NT1)*. It was repeatedly noted by NT parents that treatment had greatly exceeded their expectations, it had improved their child's confidence, self esteem and peer relationships, *'to actually put the thought in her head of what she wanted to do and achieve and set her own goals. It has been much better than what I expected' (NT1)*.

Interestingly the child's weight outcome did not influence the parents' thoughts of the dietitian or on the programme's success. Although not all NT children had a successful weight outcome their parents overwhelmingly voiced appreciation, while the children of those SC parents who criticised their experiences did not all have a negative weight outcome.

INTREPRETATION AND DISCUSSION

Due to time constraints we were unable to interview more parents or children who had been treated. We have therefore considered our following interpretation and discussion as tentative. However these results do give pointers to the skills and attitudes required by dietitians working in childhood weight management.

The NT in the present study followed a set protocol and the dietitians had formal training in behavioural change interviewing techniques. In addition their level of skills and quality of interviewing was monitored and assessed by independent assessors. These behavioural techniques are now being recommended in treatment of chronic childhood conditions (Lask 2003) but are not yet typically used in the UK. We particularly wished to find out if the

parents had found these acceptable and helpful. From the small number of NT parents interviewed, including those from the pilot study, there was widespread applauding of their experiences and the techniques used both for the parents and children – particularly goal setting, self monitoring and exploring of motivation. This suggests that these techniques used for many years successfully in the USA (Epstein et al 1994) and in adult obesity (Hunt & Pearson 2001) may have a place in the UK NHS in managing childhood obesity.

The use of rewards and monitoring of lifestyle were not routinely used in standard dietetic care and therefore it is not unexpected that parents felt these had not been used. However, in the post study audit all the SC dietitians stated that they had set goals, therefore the marked feeling among SC parents that they could not recall any goals being set is surprising. It is possible that the reason SC parents did not remember goal setting was that little emphasis was placed on keeping to the goals or that the families felt they were not included in setting the goals.

In the NT group there was a common feeling that the child's motivation had been explored and that the child had an awareness of the lifestyle changes. This was not a typical view held by the SC parents. There was a general feeling in the NT group that the child had taken some responsibility for change whereas the SC parents consistently talked of the parents being responsible. The NT group persistently mentioned their child's self-esteem/confidence increased, while this was minimal among the SC group. Improvements in self-esteem and confidence are particularly important outcomes of treatment since these tend to be low in obese children (Schwimmer et al 2003; Dixey et al 2006). These differences in perception of treatment and why only the NT parents talk of some features is revealing. This may be due to the behavioural techniques used in the NT and to the emphasis on targeting of diet, physical activity and sedentary behaviour equally as recommended in various guidelines (SIGN 2003).

Rhee et al 2006 outlined four main parenting styles – authoritative (respect for child's opinion, but maintains clear boundaries); permissive (indulgent, without discipline); authoritarian (strict disciplinarian); and neglectful (emotionally uninvolved and does not set rules). Rhee et al reported that children brought up with an “authoritarian” style of parenting were at a higher risk of being obese by first grade than any other parenting styles. They concluded that the ideal style of parenting was “authoritative” with the parents giving the children boundaries but allowing them to make choices within these boundaries (Rhee et al. 2006). Dietz and Robinson 2005 discussed the importance of parenting style in successfully engaging in paediatric obesity management (Dietz & Robinson 2005). While Golan 2006 suggested that childhood obesity could be managed exclusively by targeting change through the parents and their parenting skills (Golan 2006). In the present study the SC parents described being controlling and taking responsibility for the lifestyle changes and generally appeared to be authoritarian. On the other hand the NT parents discussed forming a partnership and generally appeared authoritative. The authoritative parenting style is analogous to that encouraged in the behavioural change techniques used in the novel treatment programme and appears to be reflected in how the NT parents describe their attitudes to their child's goal setting and the child's responsibility for following their own goals. Parent's attitudes and parenting styles should be viewed as important for successful treatment outcomes and dietitians should have an understanding of these issues.

Parent in both groups who had found the treatment a positive experience persistently described it as child friendly/focused, educational, and motivating both to the child and parent. NT parents commonly talked of a '*partnership*' having been formed between the dietitian, child and parent. It is therefore interesting that only SC parents voiced the less typical view of dissatisfaction and frustration, '*I expected more than just talk*'. When asked what could make the experience more positive these dissatisfied parents suggested treatment being more child friendly/focused, more educational and a better rapport with the dietitian. Possibly suggesting that they had not found the support and important rapport from the dietitian they were looking for during treatment.

For parents the support and attitude of the dietitian appeared to be of vital importance to them continuing with the programme and also in their perception of the outcome of the treatment. Since obesity is a chronic condition a parent's perceptions of the last health professional to treat their child could be very important to whether they are likely to engage in further treatment episodes. Barlow and Ohlemeyer 2006 cited that of 43 families who attended two or less weight management appointments (i.e. non completers), the single highest reason reported by 37% for not returning was that the programme "was not what they were looking for" and specifically they were dissatisfied with the attitude of the health professional (Barlow & Ohlemeyer 2006). This type of comment appears to be reflected by the SC parents in our study. Murtagh et al 2006 used focus groups to interview children who had completed a weight management programme in Leeds, UK. These authors reported that the children had previously perceived the attitude of dietitians as a barrier to change, '*dietitians never listen*' and '*they just tell you what to eat, what to do*' (Murtagh et al 2006). Parents of obese children interviewed by Edmonds 2005 appeared to have a mixed view on the attitude of health professionals particularly GPs and dietitians (Edmonds 2005). Although some of these parents had encountered positive and empathetic attitudes from health professionals there were strong feelings voiced on the negative, unsympathetic and unhelpful attitude of some GPs and dietitians. Our study supports the view that parents perceive the skills and attitudes of dietitians undertaking paediatric weight management as highly important and that the client-centred approach used in the NT produced a positive and supportive environment for families.

CONCLUSIONS

Due to the limited numbers of parents interviewed we would not like to suggest the superiority of one treatment over another in the present study. However there are a number of issues raised here that dietitians working in paediatric weight management and their managers should consider.

There is a move to recognise the use of behavioural change techniques and exploration of motivation in paediatric dietetics (Lask 2003;Resnicow et al 2006;Stark 2003) and we believe this paper helps to emphasis the importance of this approach. The NT parents interviewed for this study remembered and applauded the style of the techniques used in the intervention. They felt both they and their children were activity involved in the programme and they formed a working rapport with the dietitian. Only parents who had undertaken the SC dietetic treatment felt it was negative and unhelpful with no rapport developed with the dietitian.

The approach of the NT programme also appeared to promote an authoritative style of parenting. This may be beneficial in allowing children more control over their own lifestyle and lifestyle changes, thus leading to better adherence. It could also be suggested that the use of behavioural change techniques by dietitians could go beyond the treatment of childhood obesity.

The recent NICE 2006 obesity guideline suggested that areas of training required by health professions working in childhood obesity should be highlighted (NICE 2006). Within this paper we have attempted to illustrate probable areas of training for dietitians in both the skills and attitudes they employ in paediatric weight management programmes. These include the appropriate use of active listening skills, empathy, motivational techniques and behavioural change tools. The present study also suggests that only those dietitians with the appropriate interpersonal skills, expertise and training should undertake childhood weight management.

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REFERENCES

- Barlow, S. E. & Ohlemeyer, C. L. (2006) Parent reasons for nonreturn to a pediatric weight management program. *Clin Pediatr.* **45**, 355-360.
- Collins, C. E., Warren, J., McCoy, P., & Stokes, B. J. (2006) Measuring effectiveness of Dietetic interventions in child obesity: A systematic review of randomized trials. *Arch Pediat Adol Med.* **160**, 906-922.
- Dietz, W. H. & Robinson, T. N. (2005) Overweight children and adolescents. *New Engl J Med.* **352**, 2100-2109.
- Dixey, R., Rudolf, M., Murtagh, J. (2006) WATCH IT: Obesity management for children: A qualitative exploration of the views of parents. *Int J of Health Prom Educ.* **44**, 131-137
- Edmonds, L. (2005) Parents' perceptions of health professionals' responses when seeking help for their overweight children. *Fam Pract.* **22**, 287-292.
- Epstein, L. H., Valoski, A. M., Wing, R. R., & McCurley, J. (1994) Ten-Year Outcomes of Behavior Family-Based Treatment for Childhood Obesity. *Health Psychol.* **13**, 373-383.
- Epstein, L. H., Wing, R. R., & Valoski, A. M. (1985) Childhood Obesity. *Pediatr Clin N Am.* **32**, 363-379.
- Foreyt, J. P., Paschali, A. A. (2001) Behaviour therapy. In *The management of obesity and related disorders*. ed Kopleman, P. pp. 165-178 London: Martin Dunitz.
- Golan, M. (2006) Parents as agents of change in childhood obesity - from research to practice. *Int J Pediatr Obesity.* **1** 66-76.
- Hunt, P. (1995) Dietary counselling: theory into practice. *Journal of Inst.Health Educ.* **33**, 4-8.
- Hunt, P. & Pearson, D. (2001) Motivating change. *Nursing Standard.* **2**, 45-52.
- Lask, B. (2003) Motivating Children and Adolescents to Improve Adherence. *J Pediatr.* **143**, 430-433.
- Lobstein, T., Baur, L., Uauy, R., & for the IASO International Obesity Task Force (2004) Obesity in children and young people: a crisis in public health. *Obes Rev.* **5** (Supp 1), 4-85.
- Morse, J. M. (1991). "Strategies for random sampling," In *Qualitative nursing research: A contemporary dialogue*. California: Sage Publishing.
- Mulvihill, C. & Quigley, R. (2003) *The Management of Obesity and Overweight: An analysis of reviews of diet, physical activity and behavioural approaches*. 1st Ed. Evidence briefing, NHS Health Development Agency.

- Murtagh, J., Dixey, R., & Rudolf, M. C. J. (2006) A qualitative investigation into the levers and barriers to weight loss in children: opinions of obese children. *Arch Dis Child.* **91**, 920-923.
- National Institute for Health and Clinical Excellence (2006). *Obesity guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children.* NICE 43.
- Patton, M. Q. (2002) *Qualitative research and evaluation methods.* 3rd ed, London: Sage publications.
- Reilly, J. J. & Dorosty, A. R. (1999) Epidemic of Obesity in UK Children. *The Lancet.* **354**, 1874-1875.
- Resnicow, K., Davis, R., & Rollnick, S. (2006) Motivational interviewing for pediatric obesity: conceptual issues and evidence review. *JADA.* **106**, 2024-2033.
- Rhee, K. E., Lumeng, J. C., Appugliese, D. P., Kaciroti, N., & Bradley, R. H. (2006) Parenting styles and overweight status in first grade. *Pediatrics.* **117**, 2047-2054.
- Ritchie, J. & Spencer, L. (1994) Qualitative data analysis for applied policy research. In *Analyzing Qualitative Data.* eds A. Bryman & R. G. Burgess. Oxon: Routledge, pp. 173-194.
- Robinson, T. N. (1999) Behavioural Treatment of Childhood and Adolescent Obesity *Int J Obesity.* **23**,(Supp 2) S52-S57.
- Rollnick, S., Butler, C., McCambridge, J., Kinnersley, P., Elwyn, G., & Resnicow, K. (2005) Consultations about changing behaviour. *BMJ.* **331**, 961-963.
- Rollnick, S., Mason, P., & Butler, C. (1999) *Health Behavior Change. A guide for practitioners,* 1 edn, Churchill Livingstone.
- Scottish Intercollegiate Guideline Network (2003) *Management of Obesity in children and Young People,* SIGN 69. Edinburgh: SIGN
- Stark, L. J. (2003) Can nutrition counselling be more behavioural? Lessons learned from dietary management of cystic fibrosis. *P Nutr Soc.* **62**, 793-799.
- Stewart, L., Deane, M., & Wilson, D. C. (2004) Failure of Routine Management of Obese Children: an audit of dietetic intervention. *Arch Dis Child.* **89**, (supp 1) A13-16.
- Stewart, L., Houghton, J., Hughes, A. R., Pearson, D., & Reilly, J. J. (2005) Dietetic Management of Pediatric Overweight: Development of a practical and evidence-based behavioral approach. *JADA.* **105**,1810-1815.
- Schwimmer, J. B., Burwinkle, T. M., Varni, J.W. (2003) Health-related quality of life of severely obese children and adolescents. *JAMA.* **289**, 1813-1819.

Zeller, M., Kirk, S., Claytor, R., Khoury, P., Grieme, J., Santangelo, M., & Daniels, S. (2004) Predictors of attrition from a pediatric weight management program. *J Pediatr.* **144**, 466-470.

Table 1: Questions asked to families after pilot study

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- In general how did you feel about the programme – overall impression?
 - Your expectations before the start?
 - How did it compare with your expectations? Worse or better?
 - How did you find the written materials?
 - Goal setting was it useful / difficult?
 - Diary keeping was it helpful / easy to do/difficult?
 - Did rewards help you to meet your goals?
 - Number of appointments, 2 week intervals – were they easy to attend / too many / too few?
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Table 2: Brief description of behavioural change techniques

Goal setting	Goals for necessary changes in diet, physical activity levels and sedentary time are agreed between child, parent and dietitian. (Stark 2003) Goals should be SMART – Small, Measurable, Achievable, Recorded, and Timed. (Stewart et al 2005)
Contracting	The signing of a ‘contract’ between the child, parent and dietitian establishes a commitment to achieving the goals in the allotted time period.(Epstein et al 1985; Stark 2003)
Rewards for reaching goals	The parent agrees to give a ‘reward’ to the child for achieving the agreed lifestyle change goals. This is a positive reinforcement for the setting and attainment of goals. Reward should be small, inexpensive and non food. (Epstein et al 1985; Stark 2003)
Self monitoring	Recording targeted lifestyles i.e. diet, physical activity and sedentary behaviour. This enhances motivation by increasing self awareness of lifestyle behaviours and allows the child and parent to monitor progress towards set goals. (Foreyt at al 2001; Stark 2003)
Environmental/stimulus control	Encouraging changes in the environment to help 1) reduce the cues that encourage the behaviours requiring change, 2) to promote new healthier behaviours. Such as the parent not buying certain foods or routines or the child not walking past a certain shop on the way home from school.(Robinson 1999)
Problem solving	Helping the child and family to identify possible ‘high risk’ situations that may make it difficult to stick to their goals e.g. holidays, parties and wet weather. As well as identifying barriers to change and developing possible solutions to these barriers. This could be done as a paper exercise or as simulation and role play. (Robinson 1999)
Preventing relapse	At the end of the programme it is important to discuss and offer strategies to help avoid relapse into old behaviours. These would include planning ahead for difficult situations and continuing with or return to goal setting and self monitoring. (Robinson 1999)

Table 3: Outline of qualities, skills, principles and strategies of the novel treatment (Stewart et al 2005)

<p>Qualities of interviewer</p> <ul style="list-style-type: none"> • Acceptance • Genuineness • Empathy <p>Skills required by interviewer</p> <ul style="list-style-type: none"> • Appropriate use of questions (open questions) • Active listening (mirroring, paraphrasing, reflecting back) • Affirmation • Summarising 	<p>Principles of approach</p> <ul style="list-style-type: none"> • Client responsibility • Social influence • Collaboration • Expressing empathy • Rolling with resistance • Supporting self efficacy • Deploying discrepancy <p>Strategies employed</p> <ul style="list-style-type: none"> • Exploring readiness to change • Importance of change • Exploring ambivalence to change • Understanding current behaviours • Exchanging information • Exploring options • Problem solving • Goal setting • Self monitoring • Preventing relapse • Use of contracts • Receiving of rewards
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Table 4: Comparison of novel treatment and standard dietetic care

	Novel treatment	Standard care
No. of appointments	8	3-4
Duration of treatment	5 hours over 6 months	1.5 hours over 6–10m
Diet	Traffic light diet	Healthy eating
Physical activity	Aim to increase to 1 hour per day	General increase
Sedentary behaviour	Aim to reduce to < 2 hours/day	Not targeted
Motivation explored	Importance score and decisional balance chart	Not explored
Goals	Set by child	Set by dietitian
Lifestyle recording	Used throughout programme	Not used

Table 5: Characteristics of participating parents and purposive sampling frame

Characteristics	Novel treatment n= 8	Standard care n=9
Treatment goal met*	4	3
Treatment goal unmet*	4	6
Male (child)	5	3
Female (child)	3	6
5-8 years old	4	4
9-11 years old	4	5
Parent/s obese §	5	5
Depcat 1-4 ¥	6	3
Depcat 5-7	2	6

* Goal met = BMI maintained/loss Goal unmet = BMI gain

§ Parental weight is self-reported

¥ Socio-economic status derived from place of residence using the 'Carstairs Score': 1-4 defined as middle-high; 5-7 as low.