Literature Review

Health behaviour change models and approaches for families and young people to support HEAT 3: Child Healthy Weight Programmes

July 2010

Dr Pinki Sahota, Reader in Childhood Obesity
Dr Janet Wordley, Research Fellow
Jenny Woodward, Research Fellow
The Centre for Food Nutrition and Health,
Faculty of Health
Leeds Metropolitan University

Published by NHS Health Scotland,
Woodburn House, Canaan Lane, Edinburgh, EH10 4SG

NHS Health Scotland

Acknowledgements

This literature review was commissioned by NHS Health Scotland to identify the most appropriate health behaviour change models and approaches for different age groups to support the delivery of the core elements of healthy weight programmes for children. The research team would like to thank Michael Craig, Public Health Advisor (Food, Nutrition and Healthy Weight) and the Steering Group for their contributions to the report.

The authors would also like to thank Derek Charlwood, learning support officer, for his support throughout the project and the interviewees for their willingness and openness in sharing their experiences and being incredibly generous with their valuable time.

We would also like to acknowledge the Expert Panel: Dr Laurel Edmunds, Dr Sinead McElhone and Dr Jane South for their support and guidance throughout the study.

The opinions expressed in this publication are those of the author/s and do not necessarily reflect those of NHS Health Scotland.

Contact:
Dr. Pinki Sahota
Reader in Childhood Obesity
Co- ordinator, Centre for Food Health and Nutrition
Department of Nutrition and Dietetics
Civic Quarter
Calverley Street
Leeds LS1 3HE

Email: p.sahota@leedsmet.ac.uk
Tel No. 0113 8125500

Contents Page

List of Tables

List of Figures

List of Appendices

Executive Summary

What is this evidence review about?

Despite recommendations made in NICE and SIGN Practice Guidance for the inclusion of behavioural components in child weight management programmes, there is little information on the effectiveness of behavioural techniques and approaches, including which ones to incorporate in programmes. The literature review was commissioned by NHS Health Scotland to review the health behaviour change models and approaches for families, children and young people to support the development and delivery of effective child healthy weight programmes.

Secondly in light of recommendations for programmes to be delivered by appropriately trained professionals, the review aimed to identify the skills and competencies required and resources and training available for effective delivery of the behavioural components. In addition to the evidence review, interviews were undertaken with current providers of Child Weight Management (CWM) programmes within the UK.

The findings will be applied in enhancing the guidance for practitioners involved in the development and delivery of effective child healthy weight programmes and thereby support achievement of the Scottish Government's HEAT 3 target aimed at monitoring the attendance and completion of approved 'child healthy weight intervention programmes'.

What does Behavioural Therapy and Cognitive Behavioural Therapy involve?

Behavioural Therapy (BT)

Behavioural therapy (BT) consists of a series of techniques which can be utilised to achieve changes in behaviours relating to diet and exercise. NICE (2006) guidance states that for a child-focused obesity treatment programme to be considered a behavioural intervention, it must incorporate the following aspects: **self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving**. Self monitoring is used to first observe, record and monitor existing behaviours and assists in recognising the factors that influence specific behaviours. Stimulus control can then be used which involves limiting exposure to the triggering factors of such behaviours. Another characteristic technique is that of **behaviour contracts** where individuals set themselves goals. This process assists with recognising and reinforcing desirable behaviours.

Cognitive Behavioural Therapy (CBT)

Cognitive behavioural therapy (CBT) incorporates many aspects of BT but its primary focus is on **addressing faulty cognitive processes and beliefs** which perpetuate the problem in question (in this case obesity). It therefore aims to encourage individuals to identify, evaluate and then restructure their faulty reasoning using strategies including **cognitive restructuring, self-instructional training and problem solving** (Herrera et al. 2004). Patients learn to reduce their focus on weight loss and food with the help of discussions about self-esteem, body image and ways of coping with societal pressures to lose weight.

Which behavioural techniques are effective?

Behavioural Therapy

BT techniques in effective CWM programmes are included as a 'package': self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving. Programme providers also indicated that a range of BT techniques were used and considered it important in order to select appropriate techniques that could be matched to individual needs. Interview findings indicated that practitioners considered effective techniques to be monitoring and stimulus control. They also relied greatly on goal-setting as a BT technique but had discovered that families found it challenging to set effective (SMART) goals.

Cognitive Behavioural Therapy

Too few studies utilising CBT in children, and the lack of description and evaluation of specific CBT techniques, prevents conclusions on its effectiveness being drawn. CBT techniques adequately described in the few successful studies were: monitoring of negative thoughts, cognitive restructuring, problem solving and self-reinforcement. Almost half of practitioners interviewed stated they included CBT aspects in their programmes such as tools for cognitive restructuring and felt that these were integral to programme delivery, however they considered that more use should be made of these in the future. It was noted that the majority of programmes delivering CBT aspects did so via experienced or trained staff.

At what age is behavioural therapy effective?

Younger children (8-12 years)

For this age group it is more effective to teach behavioural techniques to parents through parental management skills. Effective techniques include: monitoring child's intake and activity, identifying child's problem behaviours, goal-setting, rewarding appropriate behaviours, praise, role modelling, positive social reinforcement, strategies to cope with resistance and contracting. However it was identified that parents required to be taught goal-setting and self-monitoring skills.

Very few studies that utilised CBT techniques in younger children exist .

Adolescents (over 12 years)

Whilst programmes focused on encouraging autonomy in the adolescent, it is clear that adolescents benefited from structured support from a trained professional rather than one which uses a self-help format. Tentative results

suggest that coping skills training for adolescents was beneficial. Additionally adolescents benefited from parental involvement in programmes however it is unclear as to what level of involvement is more effective.

The parental behavioural components incorporated into successful adolescent focused programmes are similar to those utilised with younger children: coping skills training, emphasizing importance of parents as role models, stimulus control and reward that promoted improvements in health.
It was shown that targeting adolescents with CBT was effective in the short-term but the lack of evaluation makes it unclear which components were responsible for the impact.

The role of parents in behavioural programmes

The evidence is unclear regarding whether children/adolescents should be seen together or separately in programme sessions. Nevertheless Parental involvement appeared to be key for all ages and the evidence indicated that teaching parents problem-solving skills appeared beneficial.

Interview findings showed programmes utilised a mixture of approaches for different reasons. For exercise sessions some felt that separate sessions for parents and children should be offered because it was perceived that the child felt better able on his/her own and therefore it was more enjoyable. On the other hand practitioners felt that when parents and child exercised together, the parent was perceived as a role model. Therefore from the evidence review and interviews a flexible approach is needed in terms of parental involvement. It is highly likely that the level of parental involvement will vary with age and developmental stage as well as with the personality of the child.

The role of parenting programmes
There was some evidence showing the potential for including general parenting skills e.g. child management skills in CWM programmes. However it is currently unclear whether it is beneficial to teach general parenting skills (i.e. becoming more authoritative parents) that can be generalised to other areas of parenting or whether it is more effective to teach parenting skills tailored to specific lifestyle factors of diet and physical activity.

Group versus one-to-one sessions?
No studies have compared group-based sessions to individual counselling sessions. However the interview findings indicated that in practice both approaches were used. It was felt the advantage of groups was that it provided support from participants who were experiencing similar situations together. However the advantage of one-to-one sessions was that it provided another layer of individualised support which was particularly helpful in addressing more complex issues.

Settings
It is possible to deliver behavioural interventions across a range of settings and therefore the recent growth in community-based interventions should allow for

improved access to a wider target group than the existing in-patient and out-patient hospital or university–based programmes.

Skills and qualities of staff
The interviews highlighted a common list of essential core skills and personal qualities for those delivering CWM programmes that practitioners felt were innate and could not be developed through training. These included communication skills and ability to engage or empathise with the families and children.

Essential interpersonal skills and qualities for those delivering CWM programmes
- Communication skills
- empathy
- able to establish a rapport
- friendly, able to engage
- able to work with people
- charismatic
- non-judgemental
- have a non-pathological view of obesity
- enthusiasm for the field of obesity and obesity management

Type of staff
The involvement of lay people in the delivery of CWM programmes was supported and it was felt that lay-people were easier to train than professionals because it meant potentially changing existing work practices for professionals. However due to the complexity of obesity and dealing with often complex cases, it was felt that in such circumstances trained professionals with counselling or therapy experience should be involved. The evidence from the literature also showed that BT and CBT components were often delivered by appropriately trained and motivated staff.

Training needs
The interviews suggested that other areas related to effective CWM delivery could be addressed through training and with the aid of appropriate resources.

Training recommended for those delivering CWM programmes
- Knowledge about obesity management;
- Experience of working with families and with groups was helpful but could be developed through training;
- Training in behaviour change models and processes so that potential for behaviour change is maximised;
- Training in BT and CBT techniques
- Ability to be flexible in programme delivery (content.) in order to meet individual needs;
- Identifying the appropriate pace of delivery so that sufficient time is given to embed new behaviours before introducing further change.
- Trained professionals with counselling or therapy experience should be involved in dealing with complex cases.

Issues for delivery of effective programmes

a) Appropriately trained staff

There appears to be a skills gap in people who can deliver behavioural programmes which may account for the slow progress in addressing the prevalent nature of childhood obesity. The interviews indicated that health professionals often were not very well equipped or lacked basic skills in addressing behaviour change including the social and emotional skills required to engage with families in this sensitive area..

A major issue is therefore around development of a skilled workforce for delivery of CWM programmes. It is apparent that training is key and particularly so for engaging with the families and then identifying and using appropriate behavioural approaches. The interview findings highlighted that staff training and support was offered by all programmes, however the length, content and resources used were varied. There appears to be a lack of knowledge about the best people to deliver CWM services and the best training packages including resources available. One particular issue is if more lay people are going to be delivering CWM programmes, it is important to identify the best training and support which includes development of good interpersonal skills and setting clear boundaries for safe practice. It is also key that in order to develop and retain an appropriately trained workforce then training, on-going support and continued professional development are considered.

b) A range of programmes is required

It is clear from the wider evidence-base that a variety of programmes are needed to address childhood obesity and both practitioners and researchers agree that “one size will not fit all” and due to the different needs based on the level of obesity, complexity of circumstances, disadvantage, ethnicity and behavioural and learning disabilities, to choose one programme does not make sense. The interview findings suggested that planners/commissioners of CWM services want to deliver one service whereas a range of options is required if we are to be successful in addressing childhood obesity.

One example suggested by practitioners is a tiered approach. For more obese and/or those with more complex needs, a more intense programme run by more highly trained staff with counselling and therapy experience is offered, for less obese cases to offer a “brief intervention” style programme which maybe run largely by lay community workers. Although this model has potential it still requires skilled people to make a judgement about the appropriate level of intervention in the first place.

Weight regain
The review indicated that most programmes showed effectiveness in child weight outcomes in the short-term. However, weight was often regained over the follow-up period. One of the barriers to effectiveness of behaviour change components highlighted in the interviews was the issue of relapse of behaviour resulting in re-gain of weight. To address this there appeared a tendency to move towards development and delivery of short courses to supplement the initial programmes. Furthermore practitioners felt there was a need to modify perceptions and view childhood obesity as a long-term condition, However to deal with relapse it was felt important it was identified and addressed as soon as it occurred.

Quality Assurance
The interviews indicated that to maintain positive outcomes staff must ensure attendance and adherence to the programme and this was found to be key as studies have shown that when this reduces, weight is regained in the child. However from a delivery aspect, the practitioners felt that the behavioural techniques included in the programmes were known to work however it was recognised that the quality of delivery was variable and in addition to offering appropriate training and support for staff, quality assurance processes were also required to ensure that the components were delivered as intended.

Recommendations for further research
A number of recommendations to improve the quality of evidence can be made:

- Standardised definitions of BT and CBT components amongst programme developers would help in evaluation of effectiveness of behavioural components and approaches;
- Authors of studies should provide better clarity and description of BT and CBT components incorporated in programmes.
- Evaluation of specific BT and CBT components including use of psychological health measures to assess impact on dietary restraint, self-esteem and body image should be incorporated in study designs.
- Studies with up to 2 years follow-up would help in the evaluation of long-term effectiveness.
- Researchers should include weight maintenance as an outcome measure during interventions thereby allowing the child to “grow into their weight”
- Evaluation of who the best people are to deliver behavioural CWM programmes and what are the best training packages available?
- With the potential increase in involvement of lay people in delivery of CWM programmes the role of lay people requires evaluation and identification of best practice for their training and support.
- As there is a need for a range of behavioural programmes there is a requirement to develop, implement and evaluate models for effective service delivery options to address childhood obesity across the age groups, levels of complexity, disadvantage and ethnicity.
- Due to the relapse issues highlighted the efficacy of providing short-courses at opportune times requires evaluation.
- Effective strategies to engage parents and maintenance of their on-going and motivation require exploration

How was this evidence briefing produced?
This evidence briefing was developed by a team from the Centre for Food, Health and Nutrition, Leeds Metropolitan University. It summarises the results of a literature review on effective behavioural components in CWM programmes drawn from seventy-four papers consisting of twelve reviews, seven qualitative studies and fifty-five interventions. In addition it reports on findings from the interviews undertaken with seven providers of CWM programmes, six of which are currently delivered within the UK. The detailed findings from the review and interviews, methods including search strategy, review methods, and the list of studies included in the review can be found in the main report.

1 Introduction

The literature review has been commissioned by NHS Health Scotland to review the health behaviour change models and approaches for families, children and young people to support the development and delivery of effective child healthy weight programmes. Despite the consistent recommendations from NICE and SIGN for the inclusion of behavioural components in child healthy weight programmes, there is little information on effectiveness of specific techniques and which to incorporate. The aim was therefore to provide information on which specific behavioural treatment components, behaviour change models and approaches should underpin clinical guidelines and childhood obesity treatment programmes.

Secondly, in light of recommendations for programmes to be delivered by appropriately trained professionals, the review aimed to identify the skills and competencies required and resources and training available for effective delivery of the behavioural components.

The outcomes of the literature review will be applied in enhancing the guidance for practitioners involved in the development and delivery of effective child healthy weight programmes; and thereby support achievement of the Scottish Government's HEAT 3 target aimed at monitoring the attendance and completion of approved 'child healthy weight intervention programmes'.

The report includes the background, aims, and objectives, sets out the scope of the review, presents a brief description of the methods and main findings. The methods and stakeholder views are then presented followed by a discussion of the implications for applying the evidence in practice and further research recommendations.

1.1 Background

The increasing levels of childhood overweight and obesity in Scotland reflects a similar picture to that of across the UK and at international level (Lobstein 2004, Wang and Lobstein 2006). Using the International Obesity Taskforce (IOTF) standard definition of paediatric overweight and obesity, the worldwide prevalence of overweight (including obesity) in children and young people aged 5-17 years is approximately 10%, with that of obesity alone being 2-3%.

Consequently, WHO has classified childhood obesity as a serious public health issue (WHO 2000). Due to the associated physical and psychosocial co-morbidities (Freedman et al. 1999; Reilly et al. 2003) that often track into adulthood (Parsons et al. 1999; Singh et al. 2008), addressing childhood obesity is a priority issue for the Scottish Government as outlined in the Better Health, Better Care Action Plan (Scottish Government 2007).

In December 2007 a new HEAT target (H 3) was set to monitor the attendance and completion of the Scottish Government's approved 'child healthy weight intervention programmes'. Child Healthy Weight Programmes Development Guidance was published in April 2008 which included recommendations on which

components should constitute an ’approved healthy weight intervention programme’.

This was based on guidance from NICE (2006) and SIGN 69 (2003) and recommends that interventions should comprise of multi-component approaches including diet and physical activity underpinned by behaviour change strategies and techniques (stimulus control, self monitoring, goal-setting, rewards for reaching goals, problem solving, coping strategies) as appropriate to the child.

Although not strictly defined as behavioural techniques, giving praise and encouraging parents to role-model desired behaviours are also recommended. It is also recommended that behavioural programmes must be family-based in order to maximise the potential of embedding the new behaviours that would lead to a greater chance of sustained behaviour change. The updated guidance from SIGN 150 (2010) has not added significantly to these original recommendations.

Furthermore, NICE guidance (2006) also recommends services should be delivered by healthcare professionals who possess relevant competencies and have received specific training. However, it is unclear whether health professionals working in the area have the necessary knowledge and skills to be able to deliver obesity treatment interventions including the behavioural components effectively; whether they are able to assess needs and deliver programmes in a flexible manner; whether they have specific training needs and which tools and resources including training opportunities currently exist.

Despite the consistent recommendations to include behavioural approaches in childhood obesity programmes there is currently no evidence of which components of behavioural treatment are most effective in the management of childhood and adolescent obesity. Specifically it is not known which behaviour change models, strategies, techniques and approaches are effective.

1.2 Purpose and Objectives – What is the aim of the review?

The purpose of the study was to conduct a literature review to identify effective behavioural treatment components in child and adolescent obesity management programmes. The results of the review aim to:

- provide information on which specific behavioural treatment components, behaviour change models and approaches should underpin clinical guidelines and childhood obesity treatment programmes;
- through stakeholder interviews identify the behavioural components employed by those who are currently involved in the delivery of child weight management (CWM) programmes; explore the skills and competencies required and identify available resources and training that may facilitate effective delivery.

2 Methodology for literature review

2.1 Focus of the review

The review has provided an update of the NICE guidance (2006), 'Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children' which focused on the evidence for effectiveness of lifestyle interventions such as dietary change, physical activity, behaviour therapy, or some combination of these components (NICE guidance (2006), Appendix 13 1.4.1 – 1.4.3).

This review has specifically focused on updating the evidence related to the effectiveness of behaviour therapy (including behaviour change models, approaches and strategies) used as part of behavioural treatment that includes varying degrees of parental involvement in childhood and adolescent obesity treatment programmes (NICE guidance (2006) Appendix 13 1.4.4 – 1.4.8).

In this review the inclusion criteria were extended from those used to develop the NICE (2006) guidance to:

- include studies undertaken in **all settings** as studies based only in clinical settings were included in the NICE guidance;

- **cover theoretical, descriptive and empirical studies** of a type not normally reviewed for NICE guidance.

It was important that evidence from different sources was selected and reviewed in a systematic way so that the results can be used to inform practice, but it was not possible to undertake a full systematic review process in the time available. The review needed to synthesise evidence and be directly relevant for practitioners, service planners/commissioners and strategic leads.

Behavioural therapy was defined as therapy aimed at changing thinking patterns and actions, especially in relation to dietary intake and eating, physical activity and sedentary behaviours, and the family's food and physical environment (Oude-Luttikhuis et al. 2009). If interventions that did not specifically include a behavioural program were classified as a dietary or physical activity intervention they were excluded from the review.

Terms that do not, in themselves, denote behavioural treatment are:
- motivational interviewing
- counselling
- learning
- psychological
- psychotherapy
- problem solving
- cognitive

2.2 Inclusion Criteria

2.2.1 Types of study

- Randomized randomised controlled trials (RCT's)
- Controlled clinical trials

- Controlled before-and-after studies
- Theoretical, descriptive and empirical studies related to treatment of childhood obesity
- Only studies with a minimum duration of 6 months or above (including follow-up) and published after 1985 to present were included

2.2.2 Population group

Overweight and obese children and adolescents,

- Children aged 5 -18 years of age
- Parents as the advocate of change
- The whole family

2.2.3 Settings

- Studies and literature based in developed countries
- All settings will were to be included. Interventions could be community, school or clinic-based.

2.2.4 Delivery

There was no restriction on who delivered the interventions. These may have included researchers, primary health physicians, nutrition/diet professionals, teachers, physical activity professionals, health promotion agencies, health departments, specialist doctors or lay personnel.

2.2.5 Types of outcome measures to be assessed

To be included, studies had to report one or more of the following primary outcomes, presenting a baseline and a post-intervention measurement.

Table 1 Types of outcome measures to be assessed

Primary outcomes	**Secondary outcomes**
Body weight in kg	Dietary intake
Height in cm	Exercise, physical activity, sedentary behaviour
Body Mass Index (BMI) in kg/m2	Participant satisfaction
percentage overweight and/or obese	Quality of life
percentage weight-loss	Self-esteem
percentage of ideal body weight	Health status
BMI z score	Economic outcomes potentially relating to weight loss or maintenance
BMI sd score	Use of health services
Waist circumference	Use of social services (e.g. voluntary or local authority services)
	Number of drop-outs at each time period, compliance and adverse events

Definition for Behavioural Treatment

For the purposes of the review the definition for behavioural treatment was the working definition as developed by NICE (2006) for the obesity guidelines (see Appendix 1. for full definition). In summary a treatment is behavioural if it:

- uses the terms behavioural treatment, cognitive behavioural treatment, behaviour therapy or CBT; mentions learning theory;
- refers to the use of the common components of behavioural treatment (self-monitoring, goal-setting, stimulus control).

2.3 Review Methods - How was the review done?

This section briefly describes the approach adopted and the review methods applied. The review process involved a series of stages from searching to review (see Box 1). A hierarchy of evidence was used to make sure that the strongest and most relevant evidence was reviewed. This meant that systematic reviews, reviews of published evidence individual interventions and qualitative studies along with key conceptual papers were included.

Box 1 Stages of the review process (see Appendix 2 for details)

1. Search strategy developed. This involved identifying key terms, inclusion and exclusion criteria and agreeing relevant databases.

2. Searches conducted using major databases, including: MEDLINE, CINAHL, ASSIA, PsycLIT, The Cochrane Library and relevant websites

3. Screening to identify the most relevant papers based on a hierarchy of evidence and relevance to the management of childhood obesity.

4. Development of data extraction forms and framework for synthesis of results.

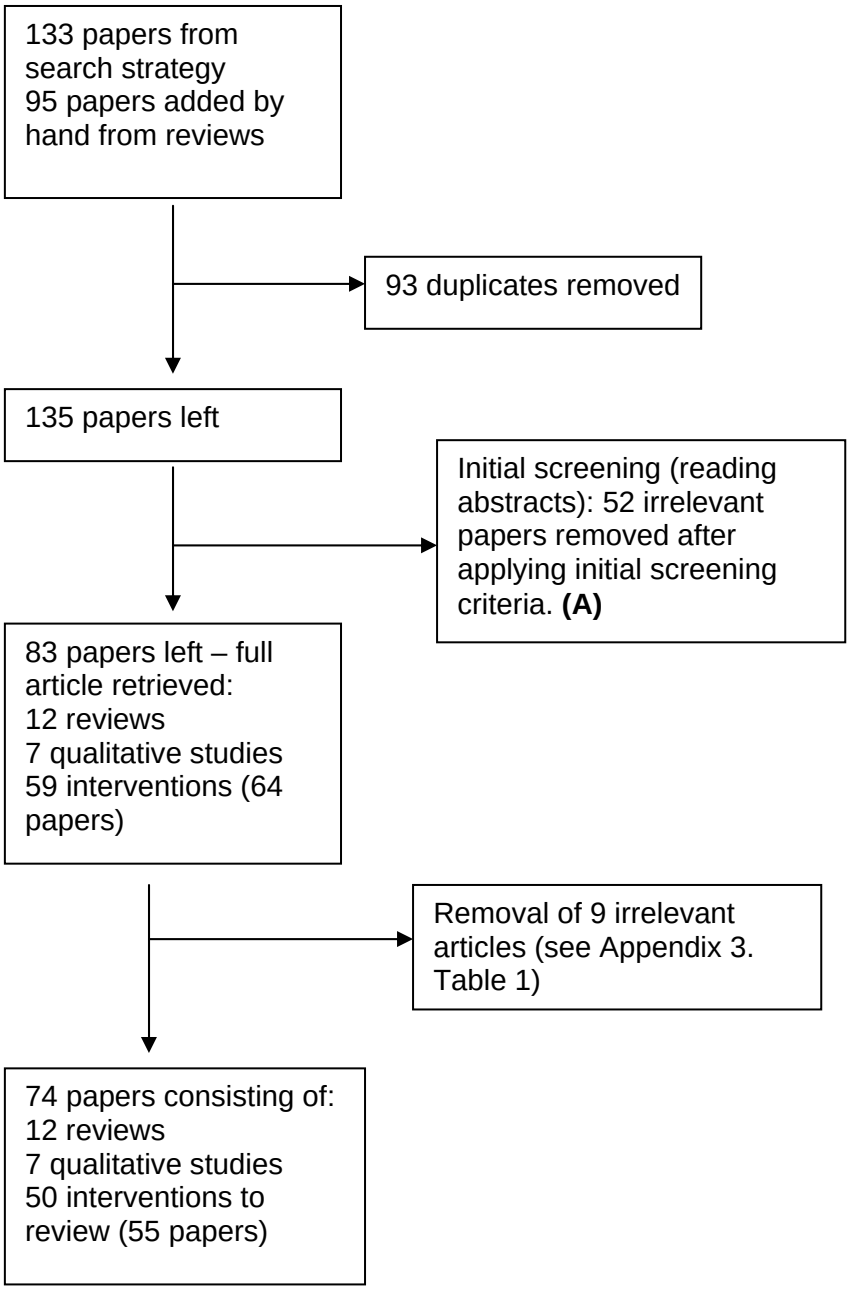
5. Review of reviews, intervention studies and qualitative papers. Information extracted on key fields using a common data extraction framework.

6. Synthesis of findings in relation to behavioural components used within effective CWM programmes.

7. Review of draft report and evidence based statements.

The keyword searches yielded 133 potential articles (see Figure 1. for results of search strategy).

Figure 1 Summary of Search Strategy



(A) 52 papers were eliminated based on disqualifying information contained in the title and abstract (i.e. studies with adult-only samples, studies conducted with pre-school children and studies that explicitly targeted obesity prevention rather than weight loss, studies that misinterpreted behavioural modification or did not describe behavioural components adequately, papers that could not be obtained in English, studies yet to be evaluated).

Papers were divided into groups: interventions, qualitative studies and review articles before data extraction occurred. To make sure that the review process was as rigorous as possible, a data extraction framework was developed and findings from each selected publication were summarised using the data extraction framework. Details of the data extraction framework are available in Appendix 3. These results were then written up for this evidence review.

The review was undertaken by 2 researchers. One of the researchers led the literature review process and the other led on the stakeholder interviews. The review process was guided by an Expert Panel of researchers with expertise in childhood obesity, behaviour change and conducting evidence reviews. A final stage involved the draft report being sent for review by the Project Steering Group at NHS Health Scotland and the Expert Panel.

2.4 Quality of the evidence

The evidence review was able to bring together a good number of review articles, interventions and qualitative studies. This has enabled some evidence-based statements about the impact of behavioural components and approaches to be produced. Furthermore, the stakeholder interviews have contributed some additional insights into the competencies, skills and training required by practitioners for effective delivery.

Despite the number of studies and reviews available, the following limitations with the review process influenced the quality of evidence-based guidance able to be produced.

The 50 intervention studies (55 papers) included interventions with a variety of components; the majority included some form of nutrition, exercise and behavioural programme and utilising a randomised control trial (RCT) design.

However the differences in intervention components and methodological aspects between the interventions made comparisons of behavioural components and approaches difficult; for many studies the behavioural components were poorly described with limited information included. There was little information about quality assurance measures and factors such as component or programme fidelity i.e. unknown whether programme components were delivered as intended and by whom and in some studies it was noted that the behavioural components were sometimes misused or misapplied; and importantly the behavioural components were not evaluated within the studies and therefore their specific impact was not clear. These differences are discussed briefly below.

Length of the intervention varied: the majority of programmes lasted between 10 and 16 weeks but some conducted treatment sessions over longer periods. For instance Epstein et al. 1987; 1990 offered 14 sessions over 8 months; Israel et al. (1990), the intervention was delivered over a period 26 weeks.

Follow-up period

The majority of studies did not have longer-term follow-ups. The exceptions were studies by Epstein and colleagues (Epstein et al. 1987; 1990) with five and ten year follow-ups and Braet and colleagues (Braet et al. 1997; 2000) who followed participants four and six years post-intervention.

The target of programmes also varied: some studies targeted the behavioural programme to the child with parents being required to attend with their child for sessions. Others used the behavioural component to target parents, training them in child management skills specifically to support their child to lose weight. Some targeted both the parent and the child either together or separately. The parents

in these interventions were either taught behavioural skills to help support their child or they were themselves targeted for their own weight loss.

Age of child
Studies also varied considerably with regard to age range of children that programmes were aimed at. Many used age 12 as a cut off, making classification of studies for this review easier and allowing discussion of studies for children under 12 and those over 12 years. However, many targeted a very wide age range such as 6-18 years (Herrera et al. 2004); 3-18 years (Tanas et al. 2007), 7-17 years (Southern et al. 2000), 6-16 years (Reinehr et al. 2003; 2009).

Socio-demographic details
As reported by Berry et al. (2004), this review found that socio-demographic details were often not reported in studies, if they were, studies predominantly included Caucasian and middle to upper class participants thereby limiting how findings could be applied to other groups.

Description of behavioural components and approaches
An additional problem highlighted in this review was the lack of detail included in papers about the specific behavioural components utilised. The majority of studies reviewed focused primarily on the effect of the treatment programme on weight loss and did not evaluate the process of behaviour change.

It was unclear in the majority of studies whether participants complied with the treatment protocol and no evaluation was made of which components of the behavioural programme were most effective in promoting behaviour change. As Tsiros et al. (2008) in their review noted, some studies tended to use an active intervention for comparison rather than a placebo or control group (e.g. Duffy & Spence. 1993; Warschburger et al. 2001) whereas others compared their behavioural programme to a programme emphasising a specific component of the intervention. For example Graves et al. (1988) and Epstein et al. (2000) both compared a behavioural intervention to one emphasising the aspect of problem solving.

This comparison to programmes other than placebos or controls makes it challenging to understand whether treatment outcomes are simply due to the presence of any sort of intervention and it is unclear whether including behavioural techniques in programmes is effective or beneficial. Another problem was that whilst some more well-described and established child behavioural treatment programmes were utilised (e.g. Cues Activity (exercise), food Intake and Rewards (CAIR) Israel et al. 1984; the Traffic Light Diet, Epstein et al. 2000), few studies utilised the same treatment programme, thereby making comparison difficult.

Furthermore, Epstein et al. (1998) stated that interventions claiming to have a behavioural component often misuse the techniques stated and/or misapply the behavioural principles. Indeed, several studies extracted during the initial search were subsequently discarded after the full paper had been retrieved due to misinterpretation of what a behavioural intervention constituted and only three

RCT's were found that convincingly described CBT (Braet et al. 2000; Duffy et al. 1993; Mellin et al. 1987).

In summary therefore, due to the above limitations in the literature, the effectiveness of interventions cannot be attributed to specific behavioural components and approaches. However evidence-based statements can be made based upon which behavioural components and approaches were included in effective CWM programmes. Additionally we have tried to counter the limitations by including stakeholder interviews with current programme providers. The issues about translating this evidence into practice and recommendations for research are discussed further in the final section of this report.

3 Results of quantitative intervention studies

3.1 Behavioural Techniques – Behavioural Therapy and Cognitive Behavioural Therapy

The behavioural interventions reviewed fell into two categories; those utilising behavioural therapy (BT) techniques and those utilising cognitive behavioural therapy (CBT) techniques. See Box 2 and Box 3 for definitions of the techniques upon which will discussion of the results will be based.

BOX 2 Definition of Behavioural Therapy (BT)

Behavioural therapy (BT) consists of a series of techniques which can be utilised to achieve changes in behaviours relating to diet and exercise. NICE (2006) guidelines state that for a child-focused obesity treatment programme to be considered a behavioural intervention, it must incorporate the following aspects: **self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving**. Self monitoring is used to observe, record and monitor existing behaviours and assists in recognising the factors that influence specific behaviours. Stimulus control can then be used which involves limiting exposure to the triggering factors of such behaviours. Another characteristic technique is that of **behaviour contracts** where individuals set themselves goals. This process assists with recognising and reinforcing desirable behaviours.

BOX 3 Definition of Cognitive Behavioural Therapy (CBT)

Cognitive behavioural therapy (CBT) incorporates many aspects of BT but its primary focus is on **addressing faulty cognitive processes and beliefs** which perpetuate the problem in question (in this case obesity). It therefore aims to encourage individuals to identify, evaluate and then restructure their faulty reasoning using strategies including **cognitive restructuring, self-instructional training and problem solving** (Herrera et al. 2004). Patients learn to reduce their focus on weight loss and food with the help of discussions about self-esteem, body image and ways of coping with societal pressures to lose weight.

3.2 Behavioural therapy

The effective CWM interventions included various combinations of the following techniques as a 'package': self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving. In most studies the effectiveness of specific components was not evaluated and therefore it is difficult to specify which components have an impact on effectiveness.

3.2.1 Which Behavioural therapy techniques are effective?

a. Problem solving

It was shown that when problem solving strategies were taught to parents of younger children, there were significantly better weight outcomes for the children (Graves et al. 1988). However, when problem solving was compared to a standard family-based intervention where parents and children were seen together or where children were seen alone, no improvements in weight outcomes were seen (Epstein et al. 2000). Therefore teaching parents problem-solving skills on their own i.e. without the presence of children may be beneficial in supporting younger children with their weight loss efforts.

b. Stimulus control and positive reinforcement

In a family-based intervention aimed at 8-12 year olds (Epstein et al. 2004) – where parents were taught stimulus control techniques to aid sedentary behaviour, change such as unplugging televisions and signposting the sedentary limit, compared to parents taught reinforcement skills aimed at motivating their children to be more active - both groups showed significant decreases in sedentary behaviour and increases in physical activity. A similar study conducted by the same group (Epstein et al. 2005) investigated whether reinforcing children for healthy eating could motivate them to change their eating behaviours compared with standard behavioural treatment. Results showed significant weight-loss in both groups which was maintained at 24 months but no additional effects were seen for the reinforcement group over the standard programme. In conclusion parents utilising positive reinforcement with 8-12 year old children to increase physical activity and utilising stimulus control to decrease sedentary activity have both been shown to be effective (Epstein et al. 2004). Whether this same strategy works with eating behaviours is less certain (Epstein et al. 2005).

c. Coping skills training

Only one study (Grey et al. 2004) evaluated the effectiveness of incorporating coping skills training into an obesity treatment programme for adolescents. It was a small pilot study and therefore caution is needed when drawing conclusions. Results at 12 months indicated that adolescents in the coping skills training group had improved their food choices, increased their dietary knowledge and had lower glucose and insulin levels. Whilst showing potential, further research is required to investigate the role of coping skills training.

Key Points

- Successful BT programmes have utilised the following strategies as a 'package': self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving.

A lack of evaluation of specific BT components makes it difficult to conclude which are the most effective techniques, however there is evidence of effectiveness for the following techniques:

- Teaching parents problem-solving skills appears beneficial to their child's weight loss efforts
- Stimulus control and positive reinforcement have shown to be effective for influencing sedentary and physical activity behaviours however the role of reinforcement for healthy eating behaviours is unproven.
- Tentative results suggest coping skills training to adolescents is beneficial.

3.2.2 At what age is behavioural therapy effective?

a) For younger obese children (under 12)

Very few studies targeted the younger child for behavioural treatment without also targeting the parent. Indeed, programmes that taught young children (8-11years) self management and other behavioural skills observed no significant effects of doing so when compared to the standard programme of education that targeted both the child and parent together (Israel et al. 1994; Epstein et al.1986).

i) The role of parents in interventions targeting obese children under 12 years

It was found that parents were the target of behavioural therapy techniques particularly in interventions aimed at younger children. Although not defined as behavioural techniques in the psychology literature, NICE (2006) recommend that parents should be encouraged to offer praise and role model desired behaviours in order to support their child's weight loss efforts.

Most studies aimed at children under 12 years used the behavioural components to focus on the parents, teaching them parental management skills. In successful programmes, parental behavioural techniques included; monitoring of the child's intake and activity, rewarding appropriate behaviours, praise, role modelling positive behaviours, positive social reinforcement, identifying the child's problem behaviours and goal-setting to implement a strategy to overcome these, strategies to cope with resistance, and contracting where parents first identified the child's 'reinforcers' of a behaviour, i.e. those that promoted adherence and then promoted in the home environment.

Appendix 4: Table A shows an example of the parents programme in one such intervention, in which parents and children under 12 years were seen separately for 15 sessions of 90 minutes. The first 10 sessions were held weekly, the next five sessions were held every two weeks for three months (Kalavainen et al. 2007).

The studies that targeted parents' behavioural components reported positive findings in post-programme which were often maintained in the short-term at one

year follow-up (Golan et al. 1998; Golley et al. 2007; Kalavainen et al. 2007; Israel et al. 1985). Although studies generally did not have longer-term follow-up periods, Epstein and colleagues have shown that targeting parents for behaviour change had positive outcomes on their child's weight loss at five and ten years (Epstein et al. 1987;1990).

Key Points

- Programmes that taught young children (8-12 years) self management and other behavioural skills observed no significant effects
- Most studies aimed at the under 12's used behavioural components to focus on parents – teaching them parental management skills.
- Successful programmes targeting parents have utilised the following strategies: monitoring of their child's intake and activity, identifying their child's problem behaviours, goal-setting, rewarding appropriate behaviours, praise, role modelling, positive social reinforcement, strategies to cope with resistance and contracting

ii) The role of the family in interventions targeting obese children under 12 years

Other interventions were family-based, targeting the behavioural component of the intervention at both parent and child. The results are inconsistent as to whether a more family-based approach is effective. For instance in an RCT family-based programme run through GP's surgeries, McCallum et al. (2007) found no beneficial effect on adiposity, either when compared to baseline or between groups at nine months follow-up, comparing family-based solution-based counselling with the control group. Hughes et al. (2008) also found no significant differences on BMI z-score between baseline and six or twelve months for the intervention group (family seen together). However, other studies have reported more favourable outcomes (Epstein et al. 1985b; Flodmark et al. 1993; Kalarchian et al. 2009).

Considering these results it appears that family-based interventions involving the parent and younger child together give more inconclusive results than when the behavioural component of the intervention targets the parent separately and teaches them child management skills. The difference appears to be in the focus on the role of the parent in the intervention. For instance, in an RCT study, Golan et al. (2006) compared the efficacy of a family-based intervention in which the parents served as exclusive agents of change. Parent-only groups were compared to groups where parents and their 6-11 year old children were seen together. Results showed that a significant reduction in percentage overweight by post-programme and at one year follow-up was observed for children in the parent-only group. Furthermore, in all the successful parent-focused interventions (Golan et al.1998; Golley et al. 2007; Kalavainen et al. 2007; Israel et al. 1985; Epstein et al. 1987; 1990) parents and children were seen separately.

iii) The role of teaching parenting skills in interventions targeting obese children under 12 years

Whilst it appears that teaching parents child management skills is beneficial to their child's weight loss, there is inconclusive evidence as to whether it is general

parenting skills per se that are the key component or parenting skills adapted and applied to lifestyle choices such as diet and physical activity.

Israel et al. (1985) compared a standard family-based behavioural intervention where parents and children were seen separately to one where parents received additional child management training. Results showed that parents and children in both groups lost weight during the eight-week programme compared to control families who increased weight. However it was only in the parent - child management training group that children showed maintenance of weight loss at one year follow-up.

Furthermore parents in this group showed increased knowledge of child management skills, however which specific child management practices had changed was not evaluated. Golley et al. (2007) compared whether teaching parents parenting skills only (using the Triple P Parenting Program) (Saunders 2008) was more beneficial to their child's weight loss than when parents were taught parenting skills plus intensive lifestyle education. Results at 12 months follow-up showed weight loss in children in both parenting groups compared to the control, however a slight advantage was observed of being in the parenting plus lifestyle group. In addition a significant gender effect with boys showing greater reduction in BMI and waist-circumference compared to girls was observed.

The inconclusive results from these studies indicate that more research is required to understand whether the role of parenting skills per se is beneficial compared to interventions focused solely on improving dietary and physical activity behaviours.

In conclusion, targeting parents for behavioural skills training, giving them child management skills and coping strategies to help support their child with weight loss is beneficial to the younger child's weight loss in the short-term, and some evidence suggests effectiveness in the longer-term. It also appears more beneficial to target the parent and the child separately. What hinders this conclusion is the lack of explanation given in papers of the behavioural components. This makes it difficult to conclude which aspects of parental influence were modified in the programmes in order to produce the desired weight loss, and additionally, which intervention components were important for modifying these parental behaviours.

Key Points

- For younger children (under 12) there is evidence to suggest that parents should be targeted for child management skills.
- There is some evidence to suggest that child management skills' training is more beneficial when the parent is taught in groups separately from their child.
- Further evidence is required to understand whether it is more beneficial to teach parents child management skills specifically tailored to lifestyle factors of diet and physical activity or whether simply teaching them general parenting skills (i.e. becoming more authoritative parents) is sufficient to positively affect their child's weight loss efforts.
- More research is required to explore apparent gender differences noted in some studies when parents have been trained in child management skills. Do girls and boys respond differently to parental authority?

b) For obese adolescents (over 12 years)

Many RCT's have shown that BT may be effective in producing short-term weight loss in adolescents (Herrera et al. 2004; Jiang et al. 2005; Saelens et al. 2002; Fullerton et al. 2007; Grey et al. 2004; Williamson et al. 2005; Johnston et al. 2007a;b; Savoye et al. 2007).

i) targeting adolescents

Unlike programmes targeting younger children, in programmes aimed at adolescents the behavioural components are often targeted at the adolescents themselves. Results from a variety of studies suggest that this approach may be beneficial in supporting the child's weight loss and weight-related behaviours in the short-term. However, only Jiang et al. (2005) followed up beyond two years so the effects of BT on long-term weight maintenance in adolescents remains unclear. For instance, Saelens et al. (2002) compared a behavioural intervention aimed at adolescents with a standard programme without BT components. Whilst not significant, results showed that children in the intervention group showed reduced BMI z-scores post-treatment which were maintained at seven months follow-up. Appendix 4: (Table B.) outlines the behavioural skills taught to adolescents through the programme. Other studies have utilised similar techniques.

Other studies have reported positive changes in weight-related behaviours: a small pilot study of city schools, Grey et al. (2004) found children aged 10 -14 s in the behavioural intervention group had improved significantly in their dietary behaviours compared to those in the control schools.

Whilst behavioural interventions targeting adolescents have been shown to be beneficial, studies have shown that guidance and instruction is key, rather than expecting adolescents to independently adhere to the programme. In an instructor led group compared to one in which the adolescents followed a self-

help programme, results at six months showed that children in the instructor-led group had significantly greater weight reduction than the self-help group (Fullerton et al. (2008).

In another study Williamson et al. (2005) developed an internet-based behavioural intervention aimed at adolescents and whilst the structure of the programme tried to promote adolescent autonomy, there was a heavy emphasis on email communication from a clinical psychologist to provide the necessary counselling in behavioural components. Results showed that children enrolled on the programme lost more mean body fat in the first six months than the control children who did not receive the email counselling and were left to follow the programme independently.

Key Points

- Targeting adolescents in behavioural therapy interventions is effective in achieving weight loss in the short-term.
- However, whilst encouraging autonomy in the adolescent is important, targeted instruction and guidance from a trained professional is required rather than relying on individual motivation.

ii) the role of the family in interventions targeting obese adolescents

Very few family-based interventions for adolescents (where both parents and adolescents attend together and taught behavioural skills) were found.

Wadden et al. (1990) targeted 14 year old adolescent girls and their mothers in a behavioural intervention. The results indicated that girls seen separately from their mother and those seen with their mothers lost more weight than those where the mother did not attend. The key finding was that regardless of treatment group, the more sessions attended by mother, the more weight the daughter lost. As this study was designed for a very specific population, caution is needed when drawing conclusions. However, it points to the fact that as well the importance of parental involvement in programmes aimed at children aged under 12 years, adolescents also require parental support.

This was also shown in another study, with both adolescent boys and girls (Savoye et al. 2005) which compared a family-based behavioural intervention with a control group (no behavioural techniques taught). The results showed that adolescents in the family group decreased their BMI relative to control adolescents and this remained significant at six and twelve months post-intervention. Johnston et al. (2007a; b) compared a family-based intervention with a self-help programme for adolescents. Their results showed that children in the family group significantly reduced their BMI z- scores compared to the self-help group both at three and six months follow-up.

It is clear from these studies that whilst targeting adolescents for behavioural skills training, it is beneficial to deliver such programmes through an instructor or with a member of their family involved rather than in a self-help format where the adolescent has sole responsibility for their progress and learning. Williamson et

al. (2005) evaluating an internet-based behaviour modification programme for adolescents intended to increase their autonomy, reported that parental participation was positively correlated with child participation in the programme which was also positively associated with greater fat loss.
The parental behavioural components incorporated into successful adolescent focused programmes used the same techniques utilised with younger children: coping skills training, emphasizing importance of parents as role models, stimulus control and reward that promoted improvements in health.

Key Points

- It appears that including parents in adolescent programmes is beneficial to weight outcomes.
- Outcomes are better when support from parents or intervention provider is offered compared to adolescent-focused self-help programmes.
- Although parental involvement seems important, it is unclear whether parents should be targeted with their adolescent or seen separately. However, some programmes have shown positive outcomes in the short-term for the role of BT in family-based approaches.
- The parental behavioural components incorporated into successful adolescent focused programmes used the same techniques utilized with younger children: coping skills training, emphasizing importance of parents as role models, stimulus control and reward that promoted improvements in health.

In light of such inconclusive evidence, the evidence from the review upholds the effective approaches recommended by SIGN 115 (2010) for supporting families of obese children in behaviour change.

Box 4 Possible effective approaches for supporting families of obese children in behaviour change (SIGN 115 (2010) guidelines)

- encouraging children and their families to make a small number of permanent changes in behaviour;
- developing an awareness of eating behaviour in the family, activity and parenting behaviours;
- encouraging the family to start monitoring their activity and exercise habits;
- use goal-setting, stimulus control, self monitoring, rewards for reaching goals;
- problem solving as a family unit.

3.3 Cognitive Behavioural Therapy

Several studies utilised CBT techniques, however assessment was hindered by poor reporting of the CBT components. Only three RCT's were found that convincingly described CBT components (Braet et al. 2000; Mellin et al. 1987; Duffy et al. 1993). Other studies utilising CBT techniques were not RCT designs

(e.g. Germann et al. 2006; Herrera et al. 2004; Knopfli et al. 2008). Furthermore others compared a standard programme encompassing CBT with one that promoted one aspect of CBT e.g. problem solving (Graves et al. 1988; Epstein et al. 2000), relaxation therapy (Warschburger et al. 2001). The variation in designs therefore makes comparisons and evaluation of the effectiveness of CBT on child weight outcomes difficult. Appendix 4: Table C outlines CBT techniques incorporated into an obesity treatment programme for 7-13 year olds.

Key Points

- CBT components are poorly described in most studies and the variation in study designs makes evaluation of the effectiveness of CBT on child weight outcomes difficult.

- CBT techniques adequately described in the few successful studies were: monitoring of negative thoughts, cognitive restructuring, problem solving and self-reinforcement.

3.3.1 Which CBT techniques are effective?

The lack of clarity in describing CBT components and the dearth of studies utilising CBT makes it difficult to evaluate its effectiveness. In addition, it is difficult to compare the effectiveness of CBT with other psychological approaches such as BT, due to similarities between techniques and/or overlap between them.

Duffy et al. (1993) compared a programme utilising CBT with one utilising BT and reported that significant reductions in percentage overweight occurred for children in both groups which were maintained at three and six months. In other words, one behavioural treatment was not superior to another. However, Herrera et al. (2004) comparing CBT with a BT programme and a control reported that the BT condition was superior to the CBT treatment. Unfortunately this study had no longer-term follow-up to see if these results were maintained.

Key Point

- There is inconclusive evidence to suggest which is superior - BT or CBT techniques.

There are a handful of studies that have attempted to compare a standard CBT programme with a programme emphasising one aspect of CBT such as relaxation training in an attempt to elicit whether such components are effective.

a. Relaxation training

Warschburger et al. (2001) compared CBT to relaxation therapy but reported similar improvements in percentage overweight in both groups.

b. Cue exposure

Braet et al. (2004) compared a standard CBT programme with one that promoted cue exposure. This included exposure sessions where participants were invited to bring in a food that they found particularly difficult to resist. They were then instructed to handle it and smell it as it is hypothesised that with long enough

exposure the craving for the food diminishes. In other treatment group children were taught to analyse emotional situations using cognitive techniques in order to equip themselves with coping strategies for the future. Results showed that children lost similar amounts of weight in both groups. Due to a lack of power it is impossible to conclude whether this lack of effect was due to the small number of participants or due to the programme components.

Key Points

- A lack of studies utilising CBT techniques hinders conclusions as to its effect on child weight loss
- In those studies utilising CBT techniques, a lack of description of the techniques hinders assessment of effectiveness of specific components.

3.3.2 At what age is CBT effective?

Due to a dearth of studies utilising CBT techniques, interventions targeting younger children and adolescents will be discussed together.

a) for obese children under 12 years

Only one study was found that utilised CBT techniques in a programme targeting children aged 8 -12 years, and as in studies utilising behavioural therapy techniques in this age group, parents were the target for the behavioural skills (Munsch et al. 2008). The study compared a CBT programme for mothers with the same programme for mothers attending with their child. No significant differences were found in any of the outcome measures between groups and due to the study design it could not be concluded whether CBT was effective. Appendix 4: Table D outlines the CBT components utilised with parents in this study.

b) for obese children over 12 years

These studies showed more favourable outcomes. Mellin et al. (1987) reporting on the SHAPEDOWN programme found adolescents treated with CBT had significant improvements in their relative weight and related behaviours compared with the control group at fourteen weeks and at one year follow-up. In an inpatient CBT-based programme, Braet and colleagues (2003) reported that children on the CBT programme lost more weight during treatment compared to controls. In another study three different delivery methods of the CBT programme were compared (individual treatment, outpatient and summer camps – see below for further discussion) with a control group and reported significantly greater weight reduction with CBT that did not differ between delivery modes.

All groups with CBT showed no further increase in percentage overweight at four and six years follow-up. Other studies not using RCT designs also showed positive outcomes: For instance, Knopfli et al. (2008) evaluated their CBT programme by a pre-post-test design and reported that all children on the programme lost significant amounts of weight by post-programme. The results also suggested gender differences as boys were shown to lose significantly more weight than girls. No explanation was offered as to why this was the case.

It appears then that CBT techniques taught to older children can be beneficial in promoting weight loss. However a lack of evaluation of the specific techniques employed hinders recommendations for application in practice. More research is required to understand the role CBT plays in treatment programmes and how it impacts on their behaviour change as well as the impact on boys and girls.

Key Points

- CBT techniques appear to be effective in supporting older children in their weight loss efforts. However lack of evaluation makes it unclear which components of CBT are effective in promoting weight-loss.
- Very few studies targeting younger children have utilised CBT.
- More research is needed into the evaluation of CBT techniques in obesity treatment programmes for children.

3.4 Effective methods of delivery

3.4.1 The role of parents

From the evidence discussed above it is clear that involving parents in CWM programmes is key. For younger children it appears to be more effective to target parents separately to teach behavioural therapy and child management techniques.

For adolescents, although BT and CBT techniques targeted at them appear to be effective, the role of parental support in CWM programmes is important. However it is unclear at present whether parents and adolescents should be targeted together or separately.

3.4.2 Pace of delivery of behavioural components

Studies have also evaluated other aspects of intervention delivery such as the pace of delivery of behavioural components. Epstein et al. (1998) have stated ‘that as behavioural therapy is designed to teach new behaviours, research showing differences in learning as a function of the interval between teaching periods may be relevant to scheduling of treatment sessions'. However, results remain inconclusive.

For instance, Senediak & Spence (1985) compared the effectiveness of the speed of delivery of a standard behavioural therapy programme to families of obese 6-12 year olds. One group were given the programme more quickly than another group (eight sessions in four weeks compared to eight sessions over fifteen weeks). These groups were also compared to a non-specific control group. Results at eleven weeks showed that children in both treatment groups had more significant weight change than those in the control group, but there were no significant differences between treatment groups.

However, in another study Epstein et al. (1994) used a yoked design RCT to understand whether pacing a behavioural intervention to the pace of parents mastering skills was more effective than delivering the intervention regardless of whether parents had mastered the skills that had been taught. Results showed that children of parents who had mastered the skills before moving onto the next level showed significantly better weight changes at six months and one year follow-up than children of parents who received the intervention at standard pace.

It appears then that these two studies show conflicting results. However, it is unclear whether parents in Senediak & Spence's (1985) study had mastered the skills being taught before being moved onto the next stage of the programme. Epstein and colleagues' study shows the benefit of pacing an intervention to participants' speed of learning. Whilst it is not clear whether parents had actually mastered the skills they professed to possess, it maybe possible that parents felt more self efficacious in coping with their obese child and putting strategies in place to help them with their weight loss.

Key Points

- Checking learning and adoption of behavioural skills as the intervention progresses and setting the pace of delivery accordingly may have more beneficial outcomes than simply delivering a programme over a set number of weeks. i.e. flexibility is key.

3.4.3 Settings

Interventions were delivered within a range of settings. Some were conducted within academic settings (universities attached to a hospital) for research purposes (e.g. Epstein's studies) often with specifically trained health professionals such as clinical psychologists or social workers, trained in CBT or BT techniques. Therefore ability to make general conclusions from results is limited due to difficulties in implementation within healthcare facilities commonly hindered by lack resources, limited access to specifically trained and motivated staff (Caprio 2006).

The most common setting utilised in studies outside the academic arena were outpatient clinics (e.g. Reinehr et al. 2003; 2009; Munsch et al. 2008) or GP clinics (e.g. McCallum et al. 2007; Flodmark et al. 1993). Others provided more intense treatments in inpatient settings which will obviously be more expensive to provide (Braet et al. 2003; 2004; Warschburger et al. 2001; Knopfli et al. 2008) and summer camps (Braet et al. 2000; Gately et al. 2007). Two studies utilised the internet (Doyle et al. 2008; Williamson et al. 2005), however participants needed access to a home computer which reduces universal application of such a programme as those without computers are prevented from participating. Additionally, such a programme still requires a trained professional to provide email support offering counselling in behavioural techniques. Other programmes used school as the setting for the programme (e.g. Fullerton et al. 2007; Johnston et al. 2007a;b; Jiang et al. 2005; Kalavainen et al. 2007) however it was unclear how the programme fitted into the standard school timetable. Regardless of the

setting, programmes still required a trained professional to run the behavioural component of the intervention.

Braet et al. (2000) compared the delivery of a standard CBT programme in different settings. Children either received individual treatment, group treatment in an outpatient clinic or attended a residential summer camp. These groups were compared to a control group. Results showed that children in all groups showed significant weight loss at post-treatment, which was maintained to at least six months follow-up. However, no significant differences were observed between treatment groups. Whilst this is only one study it could be suggested that setting of such programmes does not impact on intervention success and therefore settings could be chosen for convenience for planners and commissioners. However, although not specifically evaluated, the involvement of appropriately trained staff appears to be significantly responsible for the success of the programmes.

Key Points

- A variety of different settings have been utilised effectively to run interventions that have shown positive outcomes on child weight status.
- The involvement of appropriately trained staff in programme delivery is key.

3.5 Longer-term effectiveness of programmes on weight maintenance.

The studies in this review have shown that interventions including BT and CBT components have resulted in short-term improvements in child weight status, however evidence from longer-term follow-up, over two years is limited. Some studies report a significant decrease in weight by post-programme. but a gradual regaining in weight through follow-up. For instance, Braet et al. (2003) reported on their in-patient CBT programme that whilst all children in the treatment group lost weight compared to the control children, by the end of treatment BMI had increased by six months and fourteen months follow-up. Williamson et al. (2005) reporting on their internet-based behavioural programme for adolescents stated that whilst adolescents in the treatment group lost more mean body fat than those in the control group during the first six months, this weight loss was regained over the next eighteen months and by two years there was no difference in body fat between controls and treatment groups.

3.6 Adherence to programme – children and parents

One issue that hinders evaluation of programmes is a lack of adherence to the treatment programme by participants. For instance Doyle et al. (2008) measured adolescents' adherence to their 16 week internet-delivered obesity treatment programme. They found adherence dropped over the course of the four months of treatment and this hindered their evaluation of whether the lack of significant differences between intervention and control groups at four months was due to lack of adherence or due to an ineffective programme. The authors concluded that it is difficult to motivate adolescents over a longer period of time to continue

with their treatment. Indeed, in their process evaluation of an outpatient obesity treatment programme for morbidly obese adolescents, Germann et al. (2006) highlighted that the most successful adolescents were those attending on average about 50% more sessions over the year and were more willing to engage in the sessions.

Israel et al. (1990) highlighted the issue of parental adherence to behavioural programmes. They compared where the parent acted as a helper to their child's weight loss attempts with where parents were targeted for their own weight loss. Results at six months indicated that parents in the helper role were more favourable to their child's weight outcomes but the difference between groups had disappeared at one year follow-up. This disappearance in effect may be attributable to the significant drop in parental involvement and adherence to their parental role during follow-up.

Key Points

- Although weight-loss is achievable in the short-term, most participants regain weight over the longer-term
- Adherence to programmes is important however strategies to motivate parents and children to continue in their behaviour change efforts are required.

4 Telephone interviews with professionals delivering CWM programmes

In addition to the literature review, interviews were conducted with key providers of CWM programmes currently delivered in the UK – referred to as "participants" from now on. The principle aims were to identify specific knowledge and skills required by professionals to deliver the behavioural aspects effectively and identify any tools (resources, checklists, frameworks, and training) to facilitate delivery.

4.1 Interview Methodology

The interview schedule (Appendix 5) and the list of potential interviewees were developed in consultation with the Expert Panel and the Project Steering Group at NHS Health Scotland. Telephone interviews were used due to time constraints. All but one of the contacts agreed to participate. The interview schedule worked well leading participants logically through the main points and taking between 30 and 50 minutes. Whilst much interesting and relevant data was collected it was felt that more in-depth information could have been attained by longer, face to face interviews or observations. Data was analysed by framework analysis.

5 Interview Findings

This section will provide background information on participants, programmes and the children/adolescents attending. It will then present the findings regarding behavioural therapies used, the staff delivering the interventions and participants' recommendations for improvements.

5.1 The Participants

Six interviews were conducted. Participants' backgrounds included medical paediatric services, clinical psychology, academic research, therapy/counselling and sports/exercise.

5.2 The Programmes

Seven UK CWM programmes were discussed (two participants were from the same programme). The following programmes are described below.

- The Traffic Light programme
- The SCOTT programme
- Watch It
- Mend (Mind, Exercise, Nutrition, Do it)
- Carnegie Weight Management Programmes
- Shine
- GOALS (Getting Our Active Lifestyles Started)

Six programmes are still running but one has been discontinued. Table 2 provides background information on the programmes.

Table 2 Programme background information

Programme number	**Age of children / adolescents treated**	**Criteria for treatment (obesity level)**	**Setting**
P1 No longer continued	8 – 12 years	Over IOTF overweight range	Hospital and piloted in PCT
P2	2 – 15 years. Two versions: Under 7s and 7 and over.	Full version 98th percentile and above "Light" version – overweight but not obese	Community
P3	5 – 18 years. Two versions: 5 – 11 and 12 to 18	91st percentile and above	Community
P4	2 – 13 years Three versions: 2-4, 5-7 and 7–13.	2-4 years – any size. Others; overweight or obese	Community
P5	2 – 17 years Four versions: residential camp (8-17), day camp (7 – 17), clubs (2 – 17), web (all)	Residential camp (above 95th percentile) Day camp (above 91st percentile). Clubs (above	Variety: Residential and day camp, clubs (community) and internet.

		85th percentile)	
P6	10 – 17 years	Above 99.6 percentile.	Community
P7	3 – 16 years	Over 98th percentile	Community

Most programmes are community based, meeting in leisure centres, community/children's centres or schools out of hours sessions. P6 is set in the community despite being a tier three service and treating morbidly obese adolescents. One programme was set in a hospital but has been discontinued. P5 is located in a variety of settings; one version is in the community (clubs), two as camps (day or residential) and one on the internet.

Different versions of core programmes are evident. Most frequently, younger and older children are treated separately (P2, P3, P4) whilst other programmes are split by setting (P5) or initial assessment (P6). P5 has a number of versions in different settings. These are designed to be "modular", for example, a very obese child may attend the residential camp, then move onto the club programme in their community and use the web for support. Alternatively clients can just utilise one version of the programme. P6 utilises a stepped approach. Adolescents are assessed and then directed either to the standard twelve week programme, a six week version (if their level of commitment is unclear) or for counselling / therapy if their needs are particularly complex. This latter group would then continue onto the standard version of the programme

5.3 Description of CWM Programmes

Programmes varied in length and intensity of contact. See Table 3. It is difficult to compare 'amount' of contact as some programmes include physical activity in their sessions whilst in others it is additional.

Table 3 Programme length and intensity

Programme	**Number of sessions**	**Physical Activity: included in sessions or additional?**	**Session length**	**Overall programme length**
P1	15	Additional	1.5 hours	6 months
P2	Full version: 10 sessions Light version: 6 sessions	Additional – referred to local services	30 - 60 minutes	6 months
P3	16 core sessions then optional	Additional – referred to local authority leisure services	30 minutes	4 month core then optional to 1 year.
P4	20	Included	1 hour	10 weeks
P5	Residential / day camp – 2 to 8 weeks full time. Clubs – 12 sessions (3.5 hours	Included	Clubs - 3.5 hours	Clubs - 12 weeks

	per week)			
P6	12 core sessions then further 12 week maintenance optional	Additional – 7 types of PA provided per week	2 hours	12 weeks core then optional to 2 years.
P7	18 weekly then 6 monthly sessions	Included	2 hours	One year

Three programmes follow a 'one phase' model (P1, P4, P5 (clubs)). Session numbers vary from six to twenty and take between ten weeks and six months. Some include physical activity in these sessions whilst others treat these as separate.

The other main model is for a more intense phase followed by a reduction in intensity (P2, P3, P6, P7). P7's core programme is 18 weekly sessions then monthly sessions up to one year. P3 and P6 have an initial core phase with weekly sessions (four and three months respectively) then there is the option of additional sessions up to one or two years in total. In the case of P6 this leads to a formal qualification equivalent to a GCSE. The reason for this structure is to help prevent relapse. It was emphasised that whilst shorter programmes may lead to initial weight loss there is a tendency for weight to be regained, however with regular contact/weighing this could be picked up and addressed.

5.4 Children / Adolescents Attending

CWM programmes are attended by children/adolescents from two to eighteen years. Most programmes treat both children and adolescents (P2, P3, P4, P5, and P7) but others are more specific; P1 treats 8-12 years and P6 10–17 years. Most programmes take both overweight and obese children/adolescents but two only take those that are obese (P6, P7). One programme takes very young children (age 2 – 4) regardless of their size.

5.5 Social Economic Status (SES) and Ethnicity

The most important determinant of clients' SES and ethnicity was felt to be the areas in which the programmes were located. Most participants felt their clients broadly reflected the area's population, although one pointed out that this could not be proven without further research. This participant did have evidence however that the programme was equally effective for children/adolescents from high/low SES and BME/non-BME individuals.

With regards to SES two programmes had been set up in more deprived areas to tackle inequalities (P3, P7). Others operated in more diverse areas and as such their clients' SES varied. Some participants felt the relationship between SES and obesity was not as straightforward as previously thought. One participant had noticed more affluent families now attending. This was felt to be because of increased numbers of families with both parents working, leading to children snacking more after school and eating more fast food in the evening as parents lacked the time to cook.

With regards to ethnicity, one programme had recently successfully trialled holding separate sessions for girls and boys of Pakistani origin. This was due to discovering that the times of their sessions (clashing with prayers) and their mixed gender groups were deterring some Pakistani families from enrolling.

5.6 Complex needs

The complex needs of some of the children/adolescents attending was highlighted by some participants. Three programmes said they were able to include those with learning difficulties and disabilities (P2, P3, and P6). Having one-to-one sessions or being able to limit the size of the groups assisted in this. P6 emphasised the importance of being able to include children/adolescents with complex medical needs or those with self-harming or behavioural difficulties.

5.7 Programme Format

5.7.1 Family involvement

All programmes aim to involve families or parents. A few emphasised they were 'very very family based' with the emphasis not just on changing the child's lifestyle but also the parents, 'they're not just coming along for the ride' (P1, P2, P7). P7 for example weighed all attending family members and expected them to make lifestyle changes. Others expected parents to support their child but not necessarily make changes themselves. A couple of programmes encouraged the wider family, i.e. aunties, uncles, siblings, grandparents and anyone else who was significant to the child to attend.

Most programmes insisted on at least one parent or carer attending with their child. Some exceptions exist, for example P2, P3 allow older children (adolescents) to have some or part of the sessions alone if all agree. P6 hold a different viewpoint. They had found that some parents would not attend with their child, which could be because the child was caring for their parent or the parent had, for example, drink problems. It was felt unfair to exclude these adolescents. In addition as their clients were adolescents they wanted to 'respect their wishes' and many did not want their parents to come to groups. Parents were invited and strongly encouraged to come to certain sessions but if they did not come, the adolescent could attend alone. This fitted with the overall organisation of P6 that included having a young person's management committee who were directly involved with the running of the programme. P5 ran a residential camp so, by its nature, children/adolescents were apart from their parents. Efforts to involve parents were evident; they attended the first day of the camp and were kept in contact by weekly phone calls and reports. Parents were expected to help children activate their lifestyle plans at home, e.g. finding basketball classes for them if they had enjoyed that at camp.

A lack of engagement by parents from disadvantaged families was mentioned by P3 and P6. One programme has found that maintaining parental commitment over time is difficult due to their other priorities. The latter said that engaging with parents from disadvantaged areas was 'very very hard'. It was felt that they did not understand the seriousness of their children's obesity. On a positive note it was felt that the adolescents could become agents of change in their parent's home.

5.7.2 Parents and children – separate or joint sessions?

Whether parents and their children were treated together or separately varied by programme and activity. The majority of programmes held mainly joint sessions (P2, P3, P4, P5(club)). Two programmes also expected parents to participate in physical activity sessions with their children (P5, P7). They felt it was important for role modelling and not to do so would 'miss a trick'. They emphasised that adults may be nervous initially but they ultimately found it useful. Some however, whilst having joint sessions for nutrition and behaviour change, held separate physical activity sessions (P2, P3, P4). One participant felt there was often an unhealthy relationship between the parent and child when physical activity was concerned. They felt the child gained more confidence and enjoyed it more apart from their parents.

Other programmes held mainly separate sessions for the parents and children (P1, P6, P7). 'They all attend together but we find children pay a lot more attention, are a lot more responsive without their parents. So majority of sessions now, we do parents in one room and children in another. Do same sessions but adapted for age.' (P7). Uniquely P2 start their programme by parents attending alone, children then join their parents for subsequent sessions.

5.7.4 Group vs one-to-one

Whether children/adolescents and their parents attended group or one-to-one sessions again varied by programme. P1, P4, P7 tended to be group based whilst P2, P3 were essentially one to one. For P5 it varied by area. P6 assessed the adolescents first, if they had complex needs one-to-one sessions were offered first before joining a group. Advantages for both group and one-to-one approaches were cited by participants.

Groups were felt to offer parents an opportunity to learn from each other 'they have a rich vein of experience in how to run or be a family'. It was felt that parents started to understand they had the same problems as others. Group physical activity sessions for children helped them feel safe and not ridiculed. Groups were felt to encourage parents to suggest changes themselves rather than be dependent upon the programme deliverer. It was also felt that groups minimised the fear of being judged by a professional.

One-to-one sessions on the other hand were felt to offer 'another layer of support'. One programme provider said that it meant they could 'get to nitty-gritty of problem solving more rapidly'. If children had complex emotional or mental health issues it was often felt better to address these one-to-one. Such sessions were also felt to encourage families to attend who may lack the confidence to come to a group. On a more practical level, in sparsely populated areas one-to-one sessions meant people did not have to travel long distances or wait for a group to start.

5.8 Behaviour Change Approaches

5.8.1 Theories / models

Participants were asked which theories or models their programmes were based on. It became evident that a wide variety of theories were utilised. Three programmes mentioned Solution Focused Therapies (P3, P4, P7), two mentioned Learning Theory – adapted from Epstein for UK (P1, P2), Transtheoretical Model of Change (or The Stages of Change) (P2, P6) and Social Cognitive theory (P2, P7). One programme each mentioned Motivational Enhancing Technique (P3), Psychosocial Interventions (P6), Self-determination Theory (P5) and group based experiential learning (P4). Multiple theories or models were used by some programmes. One participant made the point that programmes should not be limited to just one theory, instead it was about taking the learnings from all those that were appropriate.

5.8.2 Behavioural Therapy Techniques

Participants were asked to list spontaneously some of the behavioural therapies they used. These included; monitoring, goal-setting, rewards, stimulus control, response substitution, problem solving, social support, motivational interviewing, role modelling, relapse prevention, reinforcement and contingency management. This is not a definitive list – in a recent audit one programme concluded 28 types of techniques were used in their programme. It was felt that a large number of techniques were needed as every family/child has different needs and responds to different approaches.

Most participants said that the behaviour change techniques and strategies were integrated into their programme ’the entire programme is behavioural‘ (P3). Some techniques were specifically taught (for example goal-setting) whilst others were embedded in how the programme was run, for example role modelling - staff were trained to act as role models by for example tasting different foods and being active.

Goal-setting was discussed in some detail. It was felt to be valuable by a number of programmes ’without a doubt‘ *(P7).* P3 felt that goals plus rewards enhanced motivation. It was thought however that there was a need to focus on concrete behaviours and choices rather than weight loss. The way in which goals were set and how much freedom the children / adolescents had in choosing their goals varied. Some programmes set long term goals for the children/adolescents, e.g. all clients had the same goals regarding being active for one hour a day/eating only one red food a day/less than two hours per day of screen time. Others ’guided‘ the children or adolescents. They would go through their monitoring forms with them, suggest options and the children/adolescents would then choose.

One programme had previously allowed families more freedom but felt they struggled to come up with SMART goals. P7 emphasised that the adolescents had to have ownership of their goals, so although they would help them ensure they were SMART, the adolescents had ultimate responsibility ’we enable them to make all their own health choices‘. A common theme that emerged was how difficult it was to get families to set and keep to their goals. It was also often

frustrating for staff to facilitate them. P7 said how it was a challenge to keep families focused because the programme encouraged very gradual goals but families often wanted to move on rapidly. Additionally it was difficult for families to appreciate the long term benefits of the programmes as they wanted to see rapid results.

Participants emphasised that they did not have evidence of effectiveness of specific techniques. The ones mentioned as probably effective included monitoring, although it was pointed out that families found it 'boring, so it was difficult to keep them focused'. Another participant mentioned stimulus control, e.g. not keeping food in house as appearing to work. Visual tools, for example demonstrating portion sizes, were also mentioned.

Relapse prevention was perceived as a very important issue. It was felt that whilst behaviour change was often achieved during the programmes, sustaining changes afterwards was more difficult. Additional sessions or increased links to the community have been introduced by some programmes.

5.8.3 Cognitive Behavioural Therapy (CBT)

About half the programmes have CBT aspects. P5 and P6 use cognitive tools for cognitive restructuring. CBT techniques are integral to P6 where adolescents with complex needs have counselling with CBT therapists before joining the programme. P7 said their staff had CBT experience. Other programmes highlighted the importance of addressing emotional mental wellbeing before embarking on lifestyle changes. One participant felt their programme would be improved with more CBT skills.

5.8.4 Overall Effectiveness

A strong theme emerged that programmes were felt to be effective 'as a whole'. Participants were confident their programmes worked. However participants did not feel it was possible to identify which elements were most successful or effective, it's 'difficult to unpick' (P1). Participants said that there was a lack of evidence and that it varied between clients 'we're a long way from being able to identify which elements work best – it depends on the child – different children respond to different aspects' (P5). One participant felt programmes could possibly be streamlined but they would not know which elements to remove.

5.9 Staff Delivering the Interventions

5.9.1 People delivering behaviour change

Two distinct types of programmes emerged regarding the type of people utilised to deliver the behavioural interventions. One type (P1, P2, P6) use highly skilled staff (e.g. clinical psychologists, dieticians, family therapists or nurses). In one programme the staff were volunteers – they were employed elsewhere but worked free of charge for the CWM programme, thus keeping costs low. The other type of programme uses lay people trained specifically to deliver the programme (P3, P4, P5). These could be parents, community workers, leisure centre receptionists or graduates in a related area. One programme kept the criteria open but currently it is professionals that are involved in the delivery (P7).

The programmes that utilise professionals tended to emphasise the complex needs of children/adolescents and their families, and as such they required highly skilled people ’because of the nature of some of the young people we work with and the complexity of some of the psychological issues that they’ve got, predominantly we’re run by nurses and therapists‘ (P6). It was mentioned that in some cases young people had disclosed that they had resorted to food because they were abused and wished to make themselves unattractive ’you need people that are skilled in managing that‘.

The programmes that employed lay people felt they had a number of advantages, mainly related to the relationship they could build with a client. It was noted that clients felt on a more equal level with lay people and they did not feel they were being judged. Some participants mentioned that previously clients had felt medical staff had acted in a ’superior‘ way with them and had a tendency to ’tell‘ parents what to do rather than guide them. It was noted however that there had been a paradigm shift recently, and more recently qualified dieticians were trained in behavioural change techniques.

The issue of training professionals compared to lay people in behavioural change techniques was discussed by a few participants. One felt it was sometimes easier to train lay people than professionals as the latter were at times reluctant to re-think how they practice and had a tendency to view the training as ’just another training course‘. If lay people are used to deliver interventions the point was made that they need good resources and thorough training (see later). Additionally care needs to be taken to exclude anything in the programme that could cause harm to clients.

5.9.2 Key skills / qualities

The majority of participants (regardless of whether they utilised lay people or professionals) emphasised that the most important attributes of those delivering the interventions was their personal qualities ’it’s the personal qualities that can make something life changing‘ (P3). Their ability to empathise with the families and children and be able to build rapport was seen as critical. They needed to be friendly, able to work with people and have good communication skills. It was also emphasised that they needed to be non-judgemental and have a non-pathological view of obesity. Many felt that these qualities were innate and could not be developed or addressed in training. Instead it needed to be a key element of the recruitment criteria.

Experience of working with families and with groups was identified as helpful, but it was felt this could be addressed in training. Many said they were not too worried about knowledge as this could generally be trained or included in resources provided as support.

One note of caution was raised by participants from the more professional led model. They felt that lay people could be trained to deliver basic interventions. However they felt therapy or counselling experience plus training in behavioural modification was essential for more complex or extreme cases.

5.9.3 Support

Support structures for staff varied. One ’lay person‘ programme offered very structured support. Trainers were ’part of a team‘ and had access to a psychologist, dietician and paediatrician. In addition, regular weekly and monthly supervision sessions were held. In another lay person programme staff had access to programme managers and regional meetings. Some programmes that operated as research projects offered on-going support from the people who had developed the programme. In relation to ‘trainee’ placements, trainees were provided with weekly mentorship and sessional reviews and ongoing monthly clinical supervision.

5.9.4 Training

Programmes offered a wide range of training packages;

- One week training plus weekly and monthly supervision (P 3)
- Two days training plus on-line seminars and workshops throughout the year. Manual to work from (P4)
- 450 hours training forming a vocational certificate in weight management. Consists of a five day course then twelve weeks on job training, followed by reflective practice sessions (P5)
- Trainee placement scheme; five day advance training followed by year training on the job (P6)

Those using more experienced staff (e.g. family therapists or clinical psychologists) tended to have less structured training programmes. Instead training would be given as required.

A strong theme emerged that there is a clear need to make sure people are trained properly to use the techniques and to monitor quality of delivery after the initial training.

5.9.5 Key Issues

- Recruiting children/adolescents onto programmes is a key issue. There is a feeling that parents do not understand the consequences of their child’s weight. Currently there is a lack of awareness of services amongst professionals in other areas (e.g. teachers / school nurses).
- Engaging with parents from low social groups is ’very, very difficult‘.
- Relapse was acknowledged as a common issue and participants highlighted that there was a tendency to move towards offering brief interventions in order to address this. In addition there was agreement that it was important to identify relapse early and intervene.

Staff related issues

- ’Skills gap‘; there was a consensus that currently there is a lack of people specifically trained in obesity related behavioural change skills. Health professionals are often not very well equipped and may lack basic skills in addressing behaviour change.
- Quality assurance of delivery was needed. It was felt that whilst it was known techniques do work, the quality of delivery can vary.

5.9.6 Participants' Recommendations

- Awareness of programmes needs to be raised. Professionals such as school nurses / PE teachers need to be encouraged to refer in.

- Relapse prevention. Systems need to be in place to prevent relapse.

- Inclusiveness. Programmes need to be accessible to those with learning difficulties / disabilities or complex emotional needs.

- Complexity of issue. It was highlighted that obesity is very complex area and the psychology of it must not be underestimated.

- A variety of services are needed. It was felt that there was no one 'ideal' programme. 'One size won't fit all' as different children / families have different needs. Many participants emphasised that choosing one 'type' of programme does not make sense. People want a range of options.

- Three participants suggested a tiered approach. For those children / adolescents that are more obese or have more complex needs an intense programme run by highly trained staff is provided. For those that are less obese or have less complex needs a 'brief intervention' style programme may be adequate, potentially run by less skilled staff. It was noted that skilled people would need to make the initial judgement.

- Skills gap. There is a requirement for more people who can deliver behavioural modification. Plus more knowledge is needed about who the best people are to deliver, and how best to train and support them.

Key Findings from interviews

- Programmes varied in their format and their delivery methods. Some were group based, some one to one. Some separated parents and children, others did not. They were based on a variety of theories. It was felt that all could be effective and each different format had its own advantages and disadvantages. One universal model was felt to be inappropriate, instead a range of options were needed.

- Many similar behaviour change techniques were used. Participants felt that whilst they worked "as a whole" it was not possible currently to isolate particularly effective strategies.

- CBT was less universally used. Potential for more programmes to incorporate CBT aspects.

- Two models of staff delivering interventions were identified. Some used professionals – felt to be necessary for more complex or extreme cases. Others used lay people - their main advantage was in the relationship they could build with children and their families.

- Personal qualities were critical for staff. They needed to be able to build a rapport, empathise and be non-judgemental.

- A ‘skills gap’ was identified. There was a need for more, well trained staff to deliver behavioural interventions specifically for child obesity.

- Idea of a ‘tiered service’ was suggested in which children and their families would be assigned to interventions appropriate to them.

6 Discussion

Seventy-four papers consisting of twelve reviews, seven qualitative studies and fifty-five papers from fifty intervention studies were included in this review. The evidence base is limited and the findings from many of the intervention studies have limited universal use owing to the following: sampling and design issues; the majority of research in the field has been conducted in motivated, middle class, Caucasian populations; differences in terms of study design (particularly intervention comparisons), often BT and CBT components were included but there was lack of standardised definitions for BT and CBT in the studies reviewed which resulted in techniques being misinterpreted and misapplied; quality (particularly sample size and power) and the range of outcome measures.

Most studies reported beneficial effects of the intervention on child weight outcomes from baseline to end of intervention or follow up. However due to the lack of description of BT and CBT components and the lack of evaluation of the specific components it is difficult to state which specific techniques and strategies have an impact on effectiveness. It is also unknown whether it is the synergistic effect of a number of components together, i.e. a ’package‘ that ultimately has an effect on outcomes. However, we have tried to counter the limitations by conducting stakeholder interviews with providers of CWM programmes currently delivered within the UK. The review has also attempted to draw out implications for practice and recommendations for further research in order to strengthen the evidence-base in this area and contribute to the effective delivery of CWM programmes.

6.1 Implications for Practice

Despite the above limitations, the review of evidence has highlighted that interventions that included BT and to an extent CBT components were effective in short-term child weight-management. Therefore the review findings together with the evidence from the interviews have generated the following implications for practice to be considered;

a) Behaviour therapy

Although a lack of evaluation of specific BT components makes it difficult to conclude which are the most effective techniques, successful CWM programmes have incorporated the following BT techniques as a ‘package’: self monitoring, stimulus control, goal-setting, reward for reaching goals and problem solving. The interviews with programme providers also indicated a range of BT techniques were employed. Practitioners considered it important that a range should be available in order to choose appropriate techniques that could be matched to individual needs. Additionally a range of strategies would allow families to select

according to preference thereby empowering them to decide on which behaviours they wish to change.

b) Cognitive behaviour therapy

A lack of studies utilising CBT, including a lack of description and evaluation of specific CBT techniques, prevents conclusions as to its effectiveness on child weight. There are limited studies demonstrating effectiveness in the use of CBT techniques in younger children. However it was shown that targeting adolescents in behavioural interventions is effective in achieving weight loss in the short-term but the lack of evaluation makes it unclear which components of CBT are effective. CBT techniques adequately described in the few successful studies were: monitoring of negative thoughts, cognitive restructuring, problem solving and self-reinforcement.

The interview findings indicated that although about half of the programmes included CBT techniques in their programmes such as cognitive restructuring, practitioners considered that more use should be made of these in the future. In one programme CBT techniques including cognitive restructuring appeared integral where adolescents with complex needs could have counselling with CBT therapists before joining the programme. Other programmes pointed to the importance of addressing emotional and mental wellbeing before embarking on lifestyle changes. However it was noted that the majority of programmes delivering CBT aspects did so via experienced or trained staff.

c) Age of child and role of parents

i) Children under 12 years

Successful programmes targeting parents of younger children have utilised the following BT techniques: monitoring of their child's intake and activity, identifying their child's problem behaviours, goal-setting, rewarding appropriate behaviours, praise, role modelling, positive social reinforcement, strategies to cope with resistance and contracting.

The review evidence indicated that parental involvement was shown to be beneficial in all CWM programmes for younger children. The evidence indicated that teaching parents problem-solving skills appears beneficial to their child's weight loss efforts. In programmes for younger children, teaching parents child-management skills was also effective. The role of general parenting skills to complement lifestyle behaviour-focused skills training appears promising, but needs to be further evaluated.

Interview findings indicated that practitioners considered effective techniques to be monitoring and stimulus control. They also relied greatly on goal-setting as a BT technique but had discovered that families found it challenging to set effective (SMART) goals. Therefore training practitioners on facilitating families to set effective goals for behaviour change is recommended.

ii) Adolescents (over 12 years)

Despite programmes encouraging adolescents to increase their autonomy it was clear from the evidence that adolescents require targeted support from those that deliver programmes rather than be left to follow self-help programmes by

themselves. It was also clear that parents also had an important role to play in providing support, and therefore their involvement in CWM was key. The parental behavioural components incorporated into successful adolescent-focused programmes used the same techniques utilised with younger children: coping skills training, emphasizing importance of parents as role models, stimulus control and reward that promoted improvements in health.

iii) The role of parents

It appears from the evidence review and interviews that including parents in CWM programmes is beneficial to weight outcomes across all age-groups. However it is unclear whether parents should be targeted with their child / adolescent or seen separately. The interview findings revealed that programmes were utilising a mixture of approaches for different reasons. The difference was apparent in exercise sessions within programmes. Some programmes felt that separate sessions for parents and children should be offered because it was perceived that the child felt better able on his/her and therefore it was more enjoyable. On the other hand practitioners felt that when parents and child exercised together, the parent was acting as a role model.

Therefore there is a need to acknowledge these differences in the level of parental involvement when developing and delivering CWM programmes. It is highly likely that the level of parental involvement will vary with age and developmental stage and therefore a flexible approach is required.

d) Delivery methods and approaches

i) group-based vs one-to one

No studies have compared group-based sessions to individual counselling sessions. However the interview findings indicated that in practice both approaches were used. It was felt the advantage of groups was that it provided support from participants who were experiencing similar situations together. However the advantage of one-to-one sessions was that it provided another layer of individualised support which was particularly helpful in addressing children with more complex issues, rather than in a group-setting environment.

ii) settings

Many of the included studies were run from a specialist obesity clinic within a hospital setting however a few were set in out-patients, with others community-based such as summer camps and schools. There was no difference in effectiveness between settings and therefore the recent growth in community-based interventions should allow for improved access to a wider target group than the existing in-patient and out-patient hospital or university–based programmes. However, it was noted that delivery of the BT and CBT components was often by trained and motivated staff and therefore this has implications for general use of findings and practical application. Therefore, although it is possible to deliver behavioural interventions across a range of settings, the success of programmes is dependent upon appropriately trained staff in behaviour change techniques and strategies.

iii) staff skills

Findings from the interviews highlighted a list of common core skills that were felt to be essential in those delivering CWM programmes which consisted of critical personal qualities including communication skills and ability to engage or empathise with the families and the children. It was clearly evident from the interviews that a set of core skills and qualities required in staff who deliver CWM programmes had emerged consisting of empathy, able to establish a rapport, friendly, able to engage, able to work with people and charismatic. Many felt some of these qualities were innate and could not be developed or addressed in training. The need to be non-judgemental and have a non-pathological view of obesity was also identified, including enthusiasm for the field of obesity and its management. Furthermore interpersonal skills including the social and emotional competencies which are required to work in this sensitive area are also key requirements.

The evidence also highlighted that staff need to be cognisant of behaviour change models and processes so that potential for behaviour change is maximised. This also included flexibility in programme delivery and skills in identifying the appropriate pace of delivery of programme components so that sufficient time is given to embed new behaviours before introducing further change. It is suggested that these aspects of programme delivery should be addressed through training.

iv) staff training and recruitment

A major issue highlighted was around the development of a skilled workforce for delivery of CWM programmes.

Whilst the evidence from the literature showed that delivery of the behavioural components was by specialist trained professionals, the interviews highlighted that delivery of CWM currently being delivered with the UK involved both professional and lay staff. However, although there was support for the role of lay people in delivery of CWM programmes, some participants felt it was critical that staff had therapy or counselling experience plus experience of behavioural modification (professional model programme). It was felt that although lay staff could be trained to deliver basic interventions there was uncertainty regarding whether they would be able to address more complex needs. It was noted in the interviews that health professionals were often not very well equipped or lacked basic skills to address behaviour change. It is apparent that training is key and particularly so for delivery of behavioural approaches. The interview findings highlighted that staff training and support was offered by all programmes however the length, content and resources used were varied with no evidence of a standardised training package.

The main difficulty raised by participants was around recruitment of appropriate staff for delivery of CWM programmes. There appears to be a skills gap around a lack of people who can deliver behavioural therapy techniques, which may partially account for the slow progress in addressing the prevalence of childhood obesity. It is key if we are to develop and retain an appropriately trained workforce that recruitment, training, on-going support and continued professional development are considered for those involved in the delivery of CWM services.

v) weight relapse

The review indicated that most programmes showed effectiveness in child weight outcomes in the short-term, however weight was often regained over the follow-up period. A barrier to effectiveness of behaviour change components in CWM programmes, highlighted in the interviews, was the issue of relapse of behaviour resulting in regain of weight. To address this there appeared a tendency to move towards development and delivery of short courses or brief interventions to supplement the initial programmes. In addition, practitioners felt that there is a need to modify perceptions and view childhood obesity as a long-term condition. However, for short courses to be effective it was important that the issue of relapse was identified as soon as it occurred so that it could be addressed before regression.

vi) quality assurance

In order to maintain positive outcomes, staff also need to ensure participants attend and adhere to the programme and are trained in motivational techniques. Sustaining involvement of parents is key as studies have shown that when this reduces, weight is regained in the child. However from a delivery aspect, the practitioners felt that the behavioural techniques selected for inclusion in the programmes were known to work, however it was recognised that the quality of delivery was variable and in addition to appropriate training and level of support for staff, quality assurance mechanisms were required to ensure that programme components were delivered as intended. This may be a consideration for programme planners / commissioners and service leads.

vii) recruitment issues

Another issue raised by practitioners was the difficulty in recruitment of children and adolescents into programmes. They suggested that there was a need to train professionals, in particular school nurses and PE teachers, to raise general awareness of the availability of services including knowledge of referral mechanisms.

viii) inclusivity - a range of CWM programme options

The interview findings suggested that commissioners of CWM services want to deliver one service/programme whereas a range of options is required if we are to be successful in addressing childhood obesity. Some participants suggested a tiered approach, rather than one programme for everyone. For more obese and/or those with more complex needs, a more intense programme run by more highly trained staff. For less obese cases, to offer a ’brief intervention‘ style which may be run largely by lay community workers. Although this model has potential to work it still requires skilled people to make a judgement about the appropriate level of intervention in the first place. It was commonly mentioned in the interviews that obesity was a complex issue and that the psychology of it must not be underestimated, however most felt that the complexity was often ignored. Additionally the issue of inclusivity was raised through the interviews as not all programmes were accessible to those with learning difficulties/disabilities for a variety of reasons. One reason for exclusion of this group may be the lack of appropriately trained staff.

6.2 Recommendations for further research

In light of the limited quality of the literature a number of recommendations to improve the quality of evidence can be made:

a) Standardise definitions of BT and CBT components

The literature review highlighted that behavioural components were sometimes misused/misapplied and/or poorly described, which made comparison and evaluation of effectiveness difficult. Therefore authors of studies should consider standard definitions and provide better clarity and description of BT and CBT components incorporated in programmes.

b) Evaluate the specific BT and CBT components

The majority of programmes reviewed focused primarily on the process of weight loss and did not evaluate the process of behaviour change or the specific components that contributed to it. Evaluation of specific components would contribute to the development of effective CWM programmes.

c) Evaluate effective strategies to engage parents and maintain their on-going support and motivation

It appears from the evidence review and interviews that including parents in CWM programmes is beneficial to weight outcomes across all age-groups. However it is unclear whether parents should be targeted with their child / adolescent or seen separately. Evaluation of the level of parental involvement according to age and developmental stage is required, as well as exploration of strategies to maintain their motivation in supporting their child.

d) Evaluate the potential role of including parenting/child management skills in CWM behavioural programmes

Further evidence is required to understand whether it is more beneficial to teach parents child management skills specifically tailored to lifestyle factors of diet and physical activity, or whether simply teaching them general parenting skills, i.e. becoming more authoritative parents, is sufficient to positively effect their child's weight loss efforts.

e) Utilise psychological health measures to assess impact on dietary restraint, self-esteem and body image

The studies reviewed included a range of primary and secondary outcomes. It is relevant to also mention that despite the majority of studies reviewed having a primary outcome measure as the child's weight loss, it was widely advocated in the literature that focussing on weight loss in childhood obesity treatment programmes may actually hinder longer-term weight maintenance. Indeed, Braet et al (2000) highlighted that too much focus on weight loss could cause the development of dietary restraint, often associated with the onset of eating disorders. Whilst few studies included measures of disordered eating, one RCT comparing a CBT programme with a control programme for children aged 12-17 years (Doyle et al. 2008) reported greater increases in dietary restraint, and less improvement in shape concerns and eating disorder attitudes amongst intervention children at follow-up compared to controls. This effect occurred despite intervention children showing significant reductions in BMI z-scores, between baseline and post-programme, compared to controls.

Due to a lack of studies utilising psychological health measures it is unclear whether other programmes caused such negative effects. What is clear however is that programmes would benefit from a more lifestyle-focused approach, where children and parents are taught about the benefits of balanced diet and exercise and encouraged to change behaviour through use of behavioural approaches, rather than focussing on weight loss per se. Indeed in the majority of studies showing positive outcomes on child weight status, the focus of the programme has been on utilising behavioural techniques to make lifestyle changes related to diet and exercise behaviours rather than on calorie restricting diets and exercise primarily for weight loss. This latter point should also be noted by research commissioners when setting expectations for primary outcomes for future research into addressing childhood obesity.

f) Design programmes with longer-term follow-up

Whilst studies showed short-term effectiveness in terms of weight-loss, few studies had longer term follow-up. Many reported that children had regained weight, and therefore studies with up to two years follow-up would help in the evaluation of long-term effectiveness. In addition weight-loss should not be the sole focus of programme effectiveness. Indeed practitioners felt that perceptions should change and childhood obesity should be viewed as a longer-term condition. Therefore other outcome measures such as lifestyle behaviour change and weight maintenance should be considered.

g) Evaluate which behaviour change theories are effective in CWM programmes

Recommendations for effective programmes include that they should be underpinned by behavioural theory or a theoretical framework but this was not well described in the literature. However the interview findings with practitioners indicated that all currently delivered CWM programmes were underpinned by theory and a variety of theories were cited. It is however, still unclear which theories are the most effective.

h) Evaluate staff training and interpersonal skills

Currently there appears to be a lack of knowledge about who the best people are to deliver CWM services and what are the best training packages, including resources available. One particular issue is if more lay people are going to be delivering CWM programmes, what is the best way of training and supporting them? Should clear boundaries be set for safe practice? Which interpersonal skills should be developed?

i) Evaluate a range of CWM programme delivery options and recruitment strategies

The review evidence included interventions involving mainly middle-class, Caucasian, motivated participants. However in practice programme providers felt that a range of programmes are required and clearly agreed that ’one size does not fit all‘. Therefore as a variety of behavioural programmes are required there is a requirement to evaluate models for effective service delivery options to address childhood obesity across the age groups, levels of complexity and disadvantage

and ethnicity. Additionally evaluation of effective recruitment strategies is also required.

j) Evaluate approaches to relapse prevention

The evidence from the review and the interviews showed that interventions utilising behavioural approaches were effective for weight-loss in the short-term, however most regained weight when behaviours relapsed. Providing on-going community support including short- courses or brief interventions to supplement the CWM programmes was suggested to address this issue. Therefore due to the relapse issues highlighted the efficacy of providing short-courses at opportune times requires evaluation.

7 Conclusion

Despite the above limitations, the review of evidence has highlighted that interventions that included BT and to an extent CBT components were effective in short-term child weight-management. Several techniques were recognised as being potentially useful and it has therefore been possible to produce evidence-based statements as to the effectiveness of various BT and CBT techniques for treating childhood obesity. The application of these techniques and approaches has been considered under the implications for practice. However a number of research recommendations have emerged from this study that aim to enhance the evidence base to further inform evidence-based recommendations on effective behavioural approaches for CWM programmes.

The findings from the interviews have supported and enhanced the findings from the review. Programmes are underpinned by a range of theoretical framework theories, utilise a variety of behavioural techniques targeted mostly at parents and apply the techniques according to perceived need.

It is clear from the wider evidence-base that a variety of programmes are needed to address childhood obesity. There is no ’ideal‘ programme and practitioners and researchers agree that ’one size will not fit all‘. Due to the different needs of children and families, for service planners to select one programme does not make sense. A range of programmes are therefore recommended in order to provide the necessary flexible approach.

Additionally in terms of delivery, CWM programmes can be delivered across a variety of settings by a range of staff ranging from specialist professionals to lay people. However due to the complexity of obesity, including the complex problems experienced by obese children, the application of behavioural techniques requires appropriately trained and supported staff. Although a set of core qualities and skills have been identified for people in delivering CWM services it was agreed that complex issues required input from specialist professionals.

In light of the above findings it is recommended for planners to consider a tiered approach as part of a care pathway for CWM services. This approach would be offered for more obese and/or those with more complex needs, a more intense programme run by more highly trained staff. For less obese cases to offer a ’brief

intervention‘ style which maybe run largely by lay community workers with appropriate skills and training.

The initial assessment of children / adolescents will be required to be undertaken by professionals with appropriate expertise. As obesity needs to be perceived as a long-term condition and the issue of relapse is critical, it is suggested that on discharge from programmes, families should be sign-posted to a range of community initiatives to assist in maintaining behaviour change and a healthy weight. Such initiatives could be delivered via leisure or voluntary services and include structured physical activity sessions including dance, sports, circuit training, aerobics and drop-in centres for weighing and obtaining further advice and motivational support. Utilisation of existing services and facilities are recommended. However a through-put of families is required into this suggested care pathway and therefore referral options and processes should be made widely available, such as to the public for self-referral but also to medical staff, teachers, social services and leisure services staff. By providing a tiered approach delivered by appropriately trained staff for each level of service, the care pathway aims to offer a family-centred, flexible, long-term solution to addressing the management of childhood obesity within the UK.

References

Alm, M., et al. (2008) A qualitative assessment of barriers and facilitators to achieving behavior goals among obese inner-city adolescents in a weight management program. Diabetes Educator, 34(2), pp.277-284.

Berry, D., Sheehan, Rebecca, Heschel, Rhonda, Knafl, Kathleen, Melkus, Gail, Grey, Margaret (2004) Family-Based Interventions for Childhood Obesity: A Review. Journal of Family Nursing, 10, pp.429-449.

Better Health, Better Care Action Plan (Scottish Government 2007) www.scotland.gov.uk/Publications/2007/12/11103453/0

Braet, C., et al. (2003) Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. Eur J Pediatr, 162(6) Jun, pp.391-6.

Braet, C., et al. (2004) Inpatient treatment for children with obesity: weight loss, psychological well-being, and eating behavior. Journal of pediatric psychology, 29(7), pp.519-529.

Braet, C. and Van Winckel, M. (2000) Long term follow-up of a cognitive behavioral treatment program for obese children. Behav Ther, 31, pp.55-74.

Braet, C., Van Winckel, M., Van Leeuwen, K. (1997) Follow-up results of different treatment programs for obese children. Acta Paediatrica, 86(4), pp.397-402.

Collins, C. E., et al. (2006) Measuring effectiveness of dietetic interventions in child obesity: a systematic review of randomized trials. Arch Pediatr Adolesc Med, 160(9) Sep, pp.906-22.

Cooper, Z., Fairburn, C. G. and Hawker, D. M. (2003) Cognitive-Behavioral Treatment of Obesity: A Clinician's Guide. New York, NY, Guilford Press.

Doyle, A. C., et al. (2008) Reduction of overweight and eating disorder symptoms via the Internet in adolescents: a randomized controlled trial. Journal of Adolescent Health, 43(2), pp.172-179.

Duffy, G. and Spench, S. H. (1993) The effectiveness of cognitive self-management as an adjunct to a behavioral intervention for childhood obesity. J Child Psychol Psychiatry, 34, pp.1043-50.

Epstein, L. H., et al. (1994) Effects of mastery criteria and contingent reinforcement for family-based child weight control. Addict Behav, 19(2) Mar-Apr, pp.135-45.

Epstein, L. H., et al. (1998) Treatment of pediatric obesity. Pediatrics, 101(suppl), pp.554-570.

Epstein, L. H., et al. (2008) Increasing healthy eating vs. reducing high energy-dense foods to treat pediatric obesity. Obesity (Silver Spring), 16(2) Feb, pp.318-26.

Epstein, L. H., et al. (2000a) Decreasing sedentary behaviors in treating pediatric obesity. Arch Pediatr Adolesc Med, 154(3) Mar, pp.220-6.

Epstein, L. H., et al. (2000b) Problem solving in the treatment of childhood obesity. Journal of Consulting and Clinical Psychology, 68(4), pp.717-21.

Epstein, L. H., et al. (2004) The effect of reinforcement or stimulus control to reduce sedentary behavior in the treatment of pediatric obesity. Health Psychol, 23(4) Jul, pp.371-80.

Epstein, L. H., et al. (2007) Family-based obesity treatment, then and now: Twenty-five years of pediatric obesity treatment. Health Psychology, 26(4) July, pp.381-391.

Epstein, L. H., Roemmich, J.N., Stein, R.I., Paluch, R.A., Kilanowski, C.K. (2005) The challenge of identifying behavioral alternatives to food: clinical field studies. Annals of Behavioral Medicine, 30(3), pp.201-209.

Epstein, L. H., et al. (1995) Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. Health Psychol, 14(2) Mar, pp.109-15.

Epstein, L. H., Valoski, A., Wing, R.R., McCurley, J. (1990) Ten-year follow-up of behavioral, family-based treatment for obese children. JAMA, 264, pp.2519-23.

Epstein, L. H., et al. (1987) Long-term effects of family-based treatment of childhood obesity. J Consult Clin Psychol, 55(1) Feb, pp.91-5.

Epstein, L. H., Wing, R., Woodall, K., Penner, B.C., Kress, M.J., Koeske, R. (1985a) Effects of family based behavioural treatment on obese 5 to 8 year old children. Behavior Therapy, 16, p.205.

Epstein, L. H., Wing, R.R., Koeske, R., Valoski, A. (1985b) A comparison of lifestyle exercise, aerobic exercise and calisthenics on weight loss in obese children. Behavior Therapy, 16, p.345.

Fennig, S. and Fennig, S. (2006a) Can we treat morbid obese children in a behavioral inpatient program? Pediatric endocrinology reviews : PER, 4, pp.590-596.

Fennig, S. and Fennig, S. (2006b) Intensive Therapy for Severe Paediatric Morbid Obesity. European Eating Disorders Review, 14(2), pp.118-124.

Flodmark, C. E., Ohlsson, T., Ryden, O., Sveger, T. (1993) Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. Pediatrics, 91(5), pp.880-884.

Freedman, D.S., Dietz, W.H., Srinivasan, S.R. & Berenson, G.S. (1999) The Relation of Overweight to Cardiovascular Risk Factors among Children and Adolescents: The Bogalusa Heart Study. Pediatrics, 103 (6), pp1175-1182.

Fullerton, G., et al. (2007) Quality of life in Mexican-American children following a weight management program. Obesity, 15(11), pp.2553-2556.

Gately, P. J., et al. (2000) The effects of a children's summer camp programme on weight loss, with a 10 month follow-up. International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity, 24(11), pp.1445-1452.

Germann, J. N., et al. (2006) Long-term evaluation of multi-disciplinary treatment of morbid obesity in low-income minority adolescents: La Rabida Children's Hospital's FitMatters program. Journal of Adolescent Health, 39(4), pp.553-561.

Golan, M. (2006a) Parents as agents of change in childhood obesity--from research to practice. International journal of pediatric obesity : IJPO : an official journal of the International Association for the Study of Obesity, 1(2), pp.66-76.

Golan, M. (2006b) Parents as agents of change in childhood obesity--from research to practice. Int J Pediatr Obes, 1(2), pp.66-76.

Golan, M. and Crow, S. (2004) Targeting parents exclusively in the treatment of childhood obesity: long-term results. Obes Res, 12(2) Feb, pp.357-61.

Golan, M., Fainaru, M. and Weizman, A. (1998) Role of behaviour modification in the treatment of childhood obesity with the parents as the exclusive agents of change. Int J Obes Relat Metab Disord, 22(12) Dec, pp.1217-24.

Golan, M., Kaufman, V., Shahar, D.R. (2006c) childhood obesity treatment: targeting parents exclusively v parents and children. British Journal of Nutrition, 95(5), pp.1008-1015.

Golan, M., et al. (1998) Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr, 67(6) Jun, pp.1130-5.

Golley, R. K., Magarey, A.M., Baur, L.A., Steinbeck, K.S., Daniels, L.A. (2007) Twelve-month effectiveness of a parent-led, family-focused weight-management program for prepubertal children: a randomised, controlled trial. Pediatrics, 119(3), pp.517-525.

Graves, T., Meyers, A. W. and Clark, L. (1988) An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. Journal of Consulting and Clinical Psychology, 56(2), pp.246-250.

Grey, M., et al. (2004) Preliminary testing of a program to prevent type 2 diabetes among high-risk youth. J Sch Health, 74(1) Jan, pp.10-5.

Grimes-Robison, C. and Evans, R. R. (2008) Benefits and barriers to medically supervised pediatric weight-management programs. Journal of Child Health Care, 12(4), pp.329-343.

Herrera, E. A., Johnston, C. A. and Steele, R. G. (2004) A comparison of cognitive and behavioral treatments for pediatric obesity. Children's Health Care, 33(2), pp.151-167.

Holt, N. L., et al. (2008) Treatment Preferences of Overweight Youth and Their Parents in Western Canada. Qualitative Health Research, 18(9) Sept., pp.1206-1219.

Hughes, A. R., Stewart, L., Chapple, J., McColl, J.H., Donaldson, M.D., Kelnar, C.J. et all. (2008) Randomised, controlled trial of a best-practice individualized behavioral program for treatment of childhood overweight: Scottish Childhood Overweight Treatment Trial (SCOTT). Pediatrics, 121(3), pp.e539-546.

Hunter, H. L., Steele, R. G. and Steele, M. M. (2008) Family-based treatment for pediatric overweight: parental weight loss as a predictor of children's treatment success. Children's Health Care, 37(2), pp.112-125.

Israel, A. C., et al. (1994) An evaluation of enhanced self-regulation training in the treatment of childhood obesity. J Pediatr Psychol, 19(6) Dec, pp.737-49.

Israel, A. C., Solotar, L.C., Zimand, E. (1990) An investigation of two parental involvement roles in the treatment of obese children. International Journal of Eating Disorders, 9(5), pp.557-565.

Israel, A. C., Stolmaker, L., Andrian, C.A. (1985) The effects of training parents in general child management skills on a behavioural weight loss program for children. Behavior Therapy, 16, p.169.

Jelalian, E., et al. (2006) 'Adventure therapy' combined with cognitive-behavioral treatment for overweight adolescents. Int J Obes (London), 30, pp.31-9.

Jiang, J. X., Xia, X.L., Greiner, T., Lian, G.L., Rosenqvist, U. (2005) A two year family based behaviour treatment for obese children. Archives of Disease in Childhood, 90, pp.1235-1238.

Johnston, C. A., et al. (2007a) Results of an intensive school-based weight loss program with overweight Mexican American children. International Journal of Pediatric obesity, 2(3), pp.144-152.

Johnston, C. A., Tyler, C., McFarlin, B.K., Poston, W.S.C., Haddock, C.K., Reeves, R. (2007b) Weight loss in overweight Mexican American children: A randomised controlled trial. Pediatrics, 120(6), pp.e1450-1457.

Kalarchian, M. A., et al. (2009) Family-based treatment of severe pediatric obesity: randomized, controlled trial. Pediatrics, 124(4), pp.1060-1068.

Kalavainen, M. P., Korppi, M.O., Nuutinen, O.M. (2007) Clinical efficacy of group-based treatment for childhood obesity compared with routinely given individual counselling. International Journal of Obesity, 31(10), pp.1500-1508.

Keller, C. S. and Allan, J. D. (2001) Evaluation of selected behavior change theoretical models used in weight management interventions. Online Journal of Knowledge Synthesis for Nursing, 8(5), p.no pagination.

Knöpfli, B. H., et al. (2008) Effects of a multidisciplinary inpatient intervention on body composition, aerobic fitness, and quality of life in severely obese girls and boys. Journal of Adolescent Health, 42(2), pp.119-127.

Lobstein, T., Baur, L. & Uauy, R. for the International Obesity Task Force Childhood Obesity Working Group (2004). Obesity in children and young people: A crisis in public health. Obesity Reviews, 5, (Suppl 1), pp4–85.

McCallum, Z., Wake, M., Gerner, B., Baur, L.A., Gibbons, K., Gold, L. (2007) Outcome data from the LEAP (Live, Eat and Play) trial: a randomised controlled trial of a primary care intervention for childhood overweight/mild obesity. International Journal of Obesity, 31(4), pp.630-636.

McCallum, Z., Wake, M., Gerner, B., Harris, C., Gibbons, K., Gunn, J. (2005) Can Australian general practitioners tackle childhood overweight/obesity? Methods and processes from the LEAP (Live, Eat and Play) randomised controlled trial. Journal of Paediatrics and Child Health, 41(9-10), pp.488-494.

Mellin, L. M., Slinkard, L. A. and Irwin, C. E., Jr. (1987) Adolescent obesity intervention: validation of the SHAPEDOWN program. **J Am Diet Assoc**, 87(3) Mar, pp.333-8.

Munsch, S., Roth, B., Michael, T., Meyer, A.H., Biedert, E., Roth, S. (2008) Randomised controlled comparison of two cognitive behavioral therapies for obese children: mother versus mother-child cognitive behavioral therapy. Psychotherapy and Psychosomatics, 77(4), pp.235-246.

National Institute for Health and Clinical Excellence (2007) Public Health Draft Guidance: Generic and Specific Interventions to Support Attitude and Behaviour change at population, community and individual levels. Clinical Guideline: London, NICE.

NHS Centre for Reviews and Dissemination, U. o. Y. (2002). Effective Health Care: the prevention and treatment of obesity. 7.

Nova, A., Russo, A., Sala, E. (2001) Long-term management of obesity in paediatric office practice: experimental evaluation of two different types of intervention. Ambulatory Child Health, 7(239).

Nuutinen, O. (1991) Long-term effects of dietary counselling on nutrient intake and weight loss in obese children. Eur J Clin Nutr, 45(6) Jun, pp.287-97.

O'Meara, S., et al. (1998) Systematic review of the effectiveness of interventions used in the management of obesity... Proceedings from the ASO and BDA symposium held on 25 November 1997 at St. Bartholomew's Hospital, London. Journal of Human Nutrition & Dietetics, 11(3), pp.203-206.

Oude-Luttikhuis, H., Baur, L., Jansen, H., Shrewsbury, V.A., O'Malley, C., Stolk, R.P. & Summerbell, C.D. (2009) Interventions for treating obesity in children. Cochrane Dabases Syst Rev, 21, (1), CD001872.

Parsons, T.J., Power, C., Logan, S. & Summerbell, C.D. (1999) Childhood predictors of adult obesity: A systematic review. International Journal of Obesity, 23 (Supple.8), pp1-107.

Position of the American Dietetic Association: individual-, family-, school-, and community-based interventions for pediatric overweight. (2006) J Am Diet Assoc, 106(6) Jun, pp.925-45.

Reilly, J.J., Methven, E., McDowell, Z.C., Hacking, B., Alexander, D., Stewart, L. & Kelnar, C.J.H. (2003) Health Consequences of Obesity. Archives of Diseases in Childhood, 88, pp748-752.

Reinehr, T., et al. (2003) Long-term follow-up of overweight children: after training, after a single consultation session, and without treatment. Journal of pediatric gastroenterology and nutrition, 37(1), pp.72-74.

Reinehr, T., et al. (2005) [Evaluation of the training program "OBELDICKS" for obese children and adolescents]. Klinische Pädiatrie, 217(1), pp.1-8.

Reinehr, T., et al. (2009) Lifestyle intervention in obese children with non-alcoholic fatty liver disease: 2-year follow-up study. Archives of Disease in Childhood, 94(6), pp.437-442.

Saelens, B. E., Sallis, J.F., Wilfley, D.E., Patrick, K., Cella, J.A., Buchta, R. (2002) Behavioral weight control for overweight adolescents initiated in primary care. Obesity Research, 10(1), pp.22-32.

Sanders, M.R. (2008). Triple P Positive Parenting Program as public health approach to strengthening parenting. Journal of Family Psychology, 22(3), 506 517.
Please see www19.triplep.net/?pid=41 for details of the Triple P Parenting Programme

Savoye, M., Shaw, M., Dziura, J., Tamborlane, W.V., Rose, P., Guandalini, C. (2007) Effects of a weight management program on body composition and metabolic parameters in overweight children: a randomized controlled trial. 297, 24(2697-2704).

Scottish Intercollegiate Guidelines Network (2010) Management of Obesity: A National Clinical Guideline 115. Edinburgh; NHS Scotland.

Senediak, C., Spence, S.H. (1985) Rapid versus gradual scheduling of therapeutic contact in a family based behavioural weight control programme for children. Behavioural Psychotherapy, 13, p.265.

Singh, A.S., Mulder, C., Twisk, J.W.R., van Mechelen, W. & Chinapaw, M.J.M. (2006) Tracking of childhood overweight into adulthood: a systematic review of the literature. Obesity Reviews, 9, pp474-488.

Sothern, et al. (2000) Weight loss and growth velocity in obese children after very low calorie diet, exercise, and behavior modification. Acta Paediatr, 89(9) Sep, pp.1036-43.

Sternberg, A., et al. (2006) The Downstart Program: a hospital-based pediatric healthy lifestyle program for obese and morbidly obese minority youth. Pediatric endocrinology reviews : PER, 4, pp.584-589.

Stewart, L., et al. (2008) The use of behavioural change techniques in the treatment of paediatric obesity: qualitative evaluation of parental perspectives on treatment. Journal of Human Nutrition & Dietetics, 21(5), pp.464-473.

Stewart, L., Houghton, J., Hughes, A.R., Pearson, D., Reilly, J.J. (2005) Dietetic management of pediatric overweight: development and description of a practical and evidence-based behavioral approach. Journal of the American Dietetic Association, 105(11), pp.1810-1815.

Tanas, R., et al. (2007) A family-based education program for obesity: a three-year study. BMC pediatrics, 7, p.33.

Taveras, E. M., Mitchell, K. and Gortmaker, S. L. (2009) Parental confidence in making overweight-related behavior changes. Pediatrics, 124(1), pp.151-158.

Tsiros, M., et al. (2008) Treatment of adolescent overweight and obesity. European Journal of Pediatrics, 167(1), pp.9-16.

Uzark, K. C., et al. Perceptions held by obese children and their parents: implications for weight control intervention. Health Education Quarterly, 15(Summer 88), pp.185-98.

van den Akker, E. L. T., et al. (2007) A cognitive behavioral therapy program for overweight children. The Journal of pediatrics, 151(3), pp.280-283.

Wadden, T. A., et al. (1990) Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. Pediatrics, 85(3) Mar, pp.345-52.

Wang, Y. & Lobstein, T. (2006) Worldwide trends in childhood overweight and obesity. International Journal of Pediatric Obesity, 1: pp11- 25

Warschburger, P. and et al. (2001) Conceptualisation and evaluation of a cognitive-behavioural training programme for children and adolescents with obesity. Int J Obes Relat Metab Disord, 25(Suppl 1), pp.S93-95.

Williamson, D. A., et al. (2005) Efficacy of an internet-based behavioral weight loss program for overweight adolescent African-American girls. Eating and Weight Disorders, 10(3), pp.193-203.

Williamson, D. A., Walden, H.M., White, M.A., York-Crowe, E., Newton, R.L., Alfonso, A. (2006) Two-year internet-based randomized controlled trial for weight loss in African-American girls. Obesity, 14(7), pp.1231-1243.

Wisotsky, W. and Swencionis, C. (2003) Cognitive-behavioral approaches in the management of obesity. Adolesc Med, 14(1) Feb, pp.37-48.

World Health Organisation (2000). Technical Report Series 894. Obesity: Preventing and Managing the Global Epidemic: Report of a WHO consultation. World Health Organisation: Geneva, 2000.

Young, K. M., et al. (2007) A meta-analysis of family-behavioral weight-loss treatments for children. Clin Psychol Rev, 27(2) Mar, pp.240-9.