Evidence-based behavioral treatment of obesity in children and adolescents

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Synopsis

Evidence based guidelines conclude that treatment of child and adolescent obesity should be directed at motivated families, who perceive obesity as a problem.

Treatment evidence suggests that treatment should involve the families and focus on changes in sedentary behavior, physical activity, and diet.

Guidelines on management of pediatric obesity recommend using a number of behavioral change techniques, notably assessing readiness to change, self monitoring, goal setting, rewards, contracting, stimulus control, problem solving, and preventing relapse.

Existing evidence suggests that even low intensity treatments are likely to have modest benefits for weight status (compared to no treatment), and more marked benefits for other outcomes such as quality of life.

Introduction and Aims

Obesity is the most common childhood disease and is widely acknowledged as having become a global epidemic.(1;2) There are well-recognized health consequences of childhood obesity, both during childhood and adulthood, affecting health, psychological and economic welfare.(3;4) The importance of finding effective strategies for the management of childhood obesity has international significance with the publication of various expert reports and evidence based guidelines in recent years.(3;5-7) However these guidelines and reports have all concluded that there is a lack of high quality published research on effective childhood obesity treatment strategies.(8;9) Although systematic reviews and guidelines indicate that there is a lack of high quality published research on effective management of pediatric obesity, the literature does provide some guidance on how to treat pediatric obesity. This review aims to provide a summary of successful approaches to help manage childhood and adolescent obesity, identified by systematic reviews and evidence-based clinical guidelines.

All of the evidence-based clinical guidelines (3;5-7;10,11) have concluded that treatment programs should be multi-component, targeting changes in diet, physical activity and sedentary behavior (in particular TV viewing and other forms of screen-based media use). The use of behavioral change strategies is recommended consistently in evidence-based guidance on treatment and these should be family-based, age appropriate, and tailored to individual

needs.(3;6;7;10;11) Table 1 summarizes the major principles of childhood weight management and outlines the main sources of evidence-based guidance on treatment. However, while the evidence-based guidelines have recommended behavioral approaches to treatment, they generally do not describe how to implement/deliver these strategies with obese children and their families. The remainder of the present review therefore expands on the issue of how to incorporate behavioral approaches into treatment interventions which is lacking from current guidelines.

Role of Health Professionals in Treatment

Most parents, and many health professionals, will be unaware of the impact of obesity in childhood and adolescence and many parents may be unaware that their own son or daughter is obese.(12) Evidence based guidance (3;5-7) indicates that a fundamental role of the health professional is to educate the child and family on the consequences of obesity and the lifestyle changes necessary to treat obesity, to help motivate families to make and sustain lifestyle changes, and to facilitate positive behavioral changes. There are a number of health professionals who may undertake management of childhood obesity either as individuals or in a multidisciplinary team, for example physicians, dietitians, clinical psychologists, health coaches. It is important that all health professionals involved have knowledge of diet, physical activity and sedentary behavior components of a healthy lifestyle, are skilled in the use of behavior change techniques and understand the importance of interacting with the child and family

in a positive, empathetic and non-judgmental manner.(13) The qualities and skills required by health professionals for behavioral treatment of childhood and adolescent obesity are outlined in table 2.

Successful treatment of obesity demands a sustained commitment and effort from the whole family and the health professional must endeavor to maintain a positive attitude and help motivate the child and family towards weight control. For parents the support and attitude of the health professional has been shown to be of vital importance to them continuing with the program and also in their perception of the outcome of the treatment.(13;14) Since obesity is a chronic condition a parent's perceptions of the last health professional to treat their child could be very important to whether they are likely to engage in further treatment episodes.

Health professionals may be office-based, working with individual children and their families.(15) Others may hold group sessions, where it is not uncommon for separate sessions for children and parents.(16;17) Most studies using group-based interventions have also included physical activity sessions as an integral part of the treatment program.(16;18) Although good evidence exists on the behaviors to target (i.e. diet, physical activity and sedentary behavior) and how to modify these behaviors (i.e. employ behavioral techniques and involve families), there is a lack of evidence on the most effective setting (e.g. community, primary care, secondary care) and delivery mode (e.g. group,

individual or both) to implement these components. (6;8) However, it seems appropriate to suggest that an integrated pathway of care should incorporate both group work and individual office based program to allow choice of the most suitable program for a child and family.

The optimal intensity and length of successful weight management programs including length of each session, number of sessions and over what period of time remains unclear. However, systematic reviews have concluded that greatest impacts on weight status have been achieved by programs which have frequent sessions (weekly or fortnightly) and which have included long term monitoring of participants progress for up to 12 months.(16;19) It is widely believed that greater 'intensity' of treatment will lead to greater effects on weight status. For example the recent 'Bright Bodies' intervention reported by Savoye et al (2007) involved twice weekly sessions of exercise and nutrition/behaviour modification for six months and then fortnightly sessions for six months, with a scheduled patient contact time of approximately 110 hours. At 12 months those undertaking the Bright Bodies intervention had a mean increase in weight of 0.3kg.(16) Whereas in the recent low-moderate intensity Scottish Childhood Overweight Treatment Trial (SCOTT; scheduled patient contact time 5-6 hours) individual families attended an office-based dietitian for nutrition and behaviour modification of 8 sessions over six months. At the end of the six months treatment those undertaking the intervention treatment had a median weight increase of 3.2 kg.(20) Readers should note that even 'intense' interventions are

achieving relatively modest changes in weight status; therefore while successful management of obese children is achievable success represents fairly modest changes in weight status for most patients.

Role of the Parents in Treatment

Evidence based guidance have repeatedly emphasized the importance of involving the whole family in making the necessary lifestyle changes. (3;5-7;10) The role of the parents is pivotal and consideration of their parenting styles is necessary for successfully engaging in childhood obesity management and health professionals should have an understanding of these issues.(10;21;22) There are four recognized parenting styles and these are briefly outlined in table 3.

The authoritative parenting style has been shown to have a positive effect on healthy weight status, with the parents giving the children boundaries while supporting them to make healthy choices within these boundaries.(21) Indeed some studies have successfully targeted childhood weight management exclusively through parent groups where, along side education on healthy family lifestyle changes, positive parenting skills and attitudes were taught.(19;23) There are a number of simple pieces of advice that can be given to parents and other adults in the family that can ensure positive support for the child in their lifestyle changes. The following list has been adapted from the evidence-based

treatment guidelines published by the Scottish Intercollegiate Guidelines Network (SIGN) in 2003, guideline number 69 (www.sign.ac.uk).(3)

- be a role model to your child and family;
- follow the same healthy eating plan; buy more healthy foods and less high sugary/high fat snacks;
- offer a treat to reward behavioral changes/ achievement of lifestyle goals (trip to the cinema or the park; book/toy/comic; friend to stay overnight);
- have regular family meal times;
- only to eat when they hungry and not to fill up on snacks all day;
- discourage eating when doing other activities, such as watching TV or doing schoolwork.

Use of Behavioral Modification Techniques

The use of behavioural change techniques, such as decisional balance charts, goal setting, self monitoring, problem solving barriers and rewards, have been shown to be successful in managing lifestyle changes in children, and have been recommended in recent evidence based guidelines (6,7). Behavioral change techniques are now considered to be central to behavioral treatment of obesity.(24-26) Most of these techniques are employed within lifestyle change programs to assist the child and family in raising their awareness and focus on the aspects of their lifestyles which require change, to motivate the child and family to make lifestyle changes and then to monitor those changes. To help

readers consider the appropriate use of these techniques, those most commonly employed are described in brief below.

Decisional Balance (exploring readiness to change)

Decisional balance involves comparing the perceived pros (benefits) and cons (costs) of making lifestyle changes. This process involves asking the child and their parents to consider the personal benefits of making lifestyle changes and 'slimming down' (e.g. be able to wear fashionable clothes, not being bullied at school or be able to run faster) and the perceived cons (costs) of changing behavior (e.g. do not like playing outside when it is raining, do not want to give up sweets or watching TV).(15) The aim of the decisional balance is to help the family realize that the pros outweigh the cons, which in turn helps motivate them to change behaviour.(27)

Problem solving barriers

Encouraging families to identify barriers preventing behavior change and for them to explore ways to overcome these barriers is a useful strategy to promote behavior change and increase motivation to change lifestyle.(24;25)

Self monitoring of lifestyle

The recording of lifestyle by the child or family (for example the amount of TV viewing) is regarded by evidence based guidelines (6,7) as being a key component of behavioral change which enhances motivation to change lifestyle

by increasing self awareness.(24;28;29) Monitoring the child's diet, activity and sedentary behavior in a diary raises awareness of his/her current lifestyle and can be used to identify changes that could be made to the child's current lifestyle and allows the family to monitor progress towards their goals.

Goal setting by the client

Goal setting is frequently used in lifestyle programs to increase and maintain the child and family's motivation for behavior change. Goal setting involves allowing the child to take responsibility for identifying the lifestyle changes they feel able to make and setting goals for these behavior changes.(24;27) However evidence based guidance suggests that it is important for the health professional and their parents to assist with goal setting by ensuring that the goals are SMART – Small, Measurable, Achievable, Recorded, and Timed.(15;30)

Evidence-based guidelines and expert committee statements (3,5-7) have repeatedly recommended that families should be encouraged to make small, progressive changes to behaviour that are realistic and achievable to enhance confidence and ensure success (e.g. gradually reduce TV viewing from 4 hours/day to 3 hours/day, finally to 2 hours/day). The agreed goals should be written down and a copy given to the child and parent to take away. The child and parents should be taught the principles of goal setting so that they can continue with goal setting in the long-term once the program has finished.

Contracting

The signing of a ‘contract’ between the child, parent and health professional may help to reinforce the commitment to meeting the lifestyle change goals which the child and parent have set in the allotted time period.(24;25;29)

Rewards for reaching goals

Allowing the child to choose a ‘reward’ for achieving the agreed lifestyle change goals has been found to be helpful as a positive reinforcement to both the setting and attainment of goals.(24;25;29) Rewards should be inexpensive, non-food items, such as a book, magazine or a family excursion.

Environmental/stimulus control

The environmental/stimulus control involves controlling stimuli or cues that encourage or sustain the ‘unhealthy behavior’ and providing cues that support/promote the new necessary lifestyle changes. For example the parent avoids buying and bringing into the home high sugary/high fat snacks or the child avoids walking home from school past a local sweet shop.(25)

Preventing relapse

Relapse prevention involves helping the child and family to identify possible ‘high risk’ situations where sticking to goals could be difficult e.g. holidays, parties and wet weather and then helping them to develop strategies to

cope with these high risk situations (e.g. participating in an indoor activity during wet weather). This may be carried out as a paper exercise or as simulation and role play. (24;25) Relapse prevention is particularly important at the end of the program to ensure that the child and family maintain behavior/lifestyle changes in the long-term. Planning ahead for difficult situations and continuing with or returning to goal setting and self-monitoring would be useful.(25)

Dietary Change

As previously noted, all evidence based guidelines and expert committee statements on treatment suggest that dietary change is an essential element of treatment. Positive, healthy changes in dietary habits that incorporate a nutritionally balanced diet in conjunction with a decrease in energy intake have been recommended consistently.(6;7;10;11) Manipulation of certain macro nutrients such as dietary fat and carbohydrates have been suggested by some authors but systematic reviews have concluded that there is little or no high quality evidence at present to recommend these approaches for childhood weight management.(6;7;10) When reviewing the child's dietary intake the health professional needs to in particular consider intakes of sugary drinks, high fat foods, snacks, meals eaten outside the house and portion sizes.(7) Necessary dietary changes should include decreasing high energy snacks while replacing these with for example fruit or vegetables, having regular meal times as well as more family meal times. Discussing portion sizes of snacks and meals can be very important as many children and their parents have little concept of age-

appropriate portion sizes. The use of particular dietary education techniques such as a 'traffic light' system may be helpful in facilitating dietary change.(15;20;29)

It is important to ensure that normal growth occurs when dietary intake is restricted. Therefore any dietary advice should ensure an adequate intake of protein, vitamins and minerals, though with modest dietary changes which aim for weight maintenance nutrient deficiency is unlikely.

Change in Physical Activity and Sedentary Behavior

Changes in physical activity levels and sedentary behavior are recommended consistently as essential components of treatment in all of the current evidence based guidelines and systematic reviews of treatment.(3;6;7;10;11) There is a widespread agreement in evidence based guidance on a target to increase physical activity of at least moderate intensity to at least one hour per day, and emphasis on the guidance listed in table 1 has been on increasing lifestyle activities rather than structured or prescribed aerobic or resistance exercise. Research has shown that placing the treatment emphasis on increasing 'lifestyle activities' such as walking can be particularly effective in controlling weight on a long-term basis.(29)

There is also widespread agreement around the recommendation to decrease sedentary behavior (screen time) to no more than 2 hours per day/14

hours per week.(6;7;10) Screen time behavior might be more measurable and/or more modifiable than changes in physical activity in obese children and may be helpful in treatment by encouraging increases in physical activity and/or decreases in energy intake.

There is still some debate around the actual amount, intensity or type of physical activity that should be undertaken by children and adolescents for weight management.(10) Evidence from recent studies which have used objective methods to measure physical activity levels and levels of sedentary behaviors suggest that obese children spend much less time than recommended in moderate-vigorous intensity physical activity and much more time than is recommended sedentary.(20;31)

Clinical Outcomes of Treatment

Dropout/non compliance with treatment

The health professional should be aware that a high drop out rate, and high non-attendance rate is to be expected, with loss of up to 50 percent of patients referred to pediatric weight management clinics.(32;33). Continued engagement with treatment seems to have a positive effect on weight outcomes,(34) while evidence is limited it appears that non-attendance at treatment or remaining on a waiting list for treatment appears to be associated with continuing increases degree of obesity as indicated by increases in BMI Z score.(18)

Weight status as an outcome

Most evidence-based treatment guidelines recommend that weight maintenance with a continued growth in height is an appropriate clinical outcome.(3;6;35) The extent to which patients typically achieve weight maintenance is unclear, but most recent obesity treatment RCT suggest that most patients do not achieve weight maintenance over the medium-long term (6-12 months). In the reporting of research BMI centiles or Z scores are often used to quantify weight based outcomes .(36;37)

At present the magnitude of the change in either weight or BMI required to produce clinically meaningful changes for obese children is unclear due to lack of evidence. Reinehr and Andler (2004) have suggested that a decrease in BMI Z score of >0.5 is required to modify cardiovascular risk factors.(38) In older children and adolescents with more extreme obesity, particularly with more severe co-morbidities, a steady weight loss may be an appropriate goal of therapy.(7) Assessing the extent to which treatment programs have impacted on weight status is difficult because of differences in study designs, patients groups, and methods of quantifying weight and BMI change,(8;9) but it is likely that most of the fairly low-moderate intensity behavioral treatment programs in Europe (18;20;39) typically achieve changes in BMI Z score of <0.3 over 6-12 months. Such modest impacts on weight status suggest that treatment should continue for prolonged periods, perhaps years. More intensive, but therefore less

generalisable, treatments may achieve greater impact on weight based outcomes.(16)

Psycho-social outcomes

Recent qualitative studies have begun to suggest that changes in weight outcomes are not as important to parents as a positive change in their child's quality of life, self esteem and self worth.(13;14) These changes should be given serious consideration by health professionals. Recent evidence also suggests that, despite modest impact on weight status, even low-moderate intensity treatment programs are associated with positive changes in measures of psycho-social health and wellbeing such as quality of life.(17;31;40)

Radical and Novel Therapies

Obese adults, usually those with morbid obesity, are often offered what are described as 'radical' treatments. The term radical treatments encompass use of drug therapy, liquid meal replacements and surgery. Some of these treatments have now been recommended for adolescents with extreme obesity, though evidence based guidelines have consistently avoided recommending such treatments for patients with less severe obesity.(6) Drugs such as Orlistat taken in combination with diet, lifestyle intervention and behavioral modifications have shown to have a modest additive effect in teenagers.(6;41)

Other relatively new modes of treatment for children and adolescents such as residential treatment,(42) surgery,(6) have also shown some promise. However, systematic reviews and evidence based management guidelines have concluded consistently that the evidence on these treatments is limited in both quality and quantity at present and they may be more appropriate for adolescent patients with more extreme obesity and with serious co-morbid conditions.

Conclusions

The evidence base suggests that treatment of child and adolescent obesity should be directed at motivated families, who perceive obesity as a problem and have indicated a willingness to make lifestyle changes. The evidence suggests that management should involve the whole families and focus on changes in sedentary behavior, physical activity, and diet.

Management should only be undertaken by health professionals who have had the necessary training and are motivated. They should be skilled in the appropriate use of behavioral change techniques notably assessing readiness to change, self monitoring, goal setting, rewards, contracting, stimulus control, problem solving, and preventing relapse.

The intensity and length of the ideal treatment program is still unclear. However even low intensity treatments are likely to have modest benefits for

weight status (compared to no treatment), and marked benefits for other outcomes such as quality of life.

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Table 1. Principles of Treatment of Obesity in Children and Adolescents Derived from Evidence Based Treatment Guidelines

Principles of treatment	**Internet based sources of evidence**
Treatment should only be commenced when the parents are ready and willing to make lifestyle changes. Treatment should be family based, with at least one of the parents involved. Lifestyle changes in diet, physical activity and sedentary behaviors should be targeted. Behavioral change techniques should be an integral part of any treatment program. Weight maintenance is an acceptable goal of treatment for most patients; with height increasing and the BMI decreasing over time. For children over 7, weight loss of not> 0.5kg per month may be advised.(3;6;7;10).	Evidence-based review & management guidance (Scotland); SIGN 69 www.sign.ac.uk English guidelines NICE 43 (2006) www.nice.org.uk/guidance/CG43/guidance USA Expert committee report on management (Barlow 2007) www.pediatrics.org/cgi/content /full/120/supplement_4/S164 Evidence-based review & management guidance (Australia) ; www.obesityguidelines.gov.au Review of systematic reviews (Canada); www.caphc.org/partnerships/obesity.html Cochrane reviews of prevention and treatment (Summerbell et al); www.nelh.nhs.uk

Table 2: Qualities and skills required for optimal treatment by health professionals (15)

Qualities of health professional	**Skills required by health professional**
• Acceptance • Genuineness • Empathy	• Appropriate use of questions (open questions) • Active listening (mirroring, paraphrasing, reflecting back) • Affirmation • Summarizing

Table 3 Parenting styles (21)

Authoritative (respect for child's opinion, but maintains clear boundaries)	**Permissive** (indulgent, without discipline)
Authoritarian (strict disciplinarian)	**Neglectful** (emotionally uninvolved and does not set rules).