The management and treatment of obesity in children and youth: a briefing for European policymakers

The present briefing has been written to support policymakers, civil society organisations (CSOs) and other stakeholders concerned with treatment and weight management options for childhood and adolescent obesity. This briefing will support the development of childhood obesity treatment and management guidelines and recommendations. It summarises the evidence on available treatments provided by systematic reviews, cost studies, case studies and other resources and guidelines that have been compiled in the World Obesity Federation’s policy dossier, available here.

INTRODUCTION

The prevalence of overweight and obesity has been increasing globally: in 2016, it was estimated that 340 million school-age children were living with overweight.¹ The European Union is no exception: in 2013, 4.5m children between the age of five and 18 years were living with obesity.² By 2025, this number is projected to reach 4.8m.²

Recently, the World Health Organization (WHO) has flagged childhood obesity as “one of the most serious public health challenges of the 21st century.”¹ In response to this global epidemic, “WHO Member States in the 66th World Health Assembly (WHA) have agreed on a voluntary global non-communicable disease (NCD) target to halt the rise in diabetes and obesity.”¹

Severe obesity in children¹ affects around 2% of all children in the European region, with high variation between countries: it affects over 6% of all boys in Italy, Greece and Malta.³ Treatment for these children is urgently needed. Multi-component interventions that include diet, physical activity and family components are often identified as the first option. Given the growing prevalence of childhood obesity across Europe, consideration is also now being brought to dietary, pharmacological and surgical treatment options.

“Obesity in children is different from obesity in adults in some important respects. The main difference is that all children and adolescents need to grow; for example, during puberty a child’s weight will double and their height increase by 20%. This has obvious consequences for the diagnosis, prevention and treatment of obesity in childhood.”⁴

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¹ Defined as +3sd in the WHO growth reference charts, equivalent to an adult BMI over 35kg/m².
TREATMENT OPTIONS

The main goal of obesity treatment interventions is to improve “long-term physical health through permanent healthy lifestyle habits.” However, the success of an intervention should not be solely seen as a reduction in age-adjusted BMI, but should be viewed in a more holistic manner, taking into account a person’s “well-being, emotional status and the plethora of other obesity-associated problems that are relevant for the health of the child.”

Today, Europe remains strongly focused on multi-component interventions for the treatment of childhood obesity. The European Medicine Agency recommends an incremental approach to childhood obesity treatment, in which bariatric surgery should be considered the ultimate option, as indicated in Figure 1.

Figure 1. Theoretical hierarchy of interventions for childhood and adolescent obesity.

Lifestyle & behavioural interventions

Lifestyle interventions focusing on diet and physical activity remain the primary treatment option for childhood obesity provided by health care professionals. These may be supported through a range of behavioural therapy techniques. Multidisciplinary lifestyle interventions have been defined as “the cornerstone of obesity treatment,” with family-based interventions identified as the best-practice in the treatment of childhood obesity. Recently, it has been highlighted that involving parents in the implementation of treatment intervention is more beneficial than solely focusing on children.
A range of behaviour change techniques has been identified in order to alter thoughts and actions associated with food consumption, physical activity and sedentary behaviours, including, among others, the following:13,14

1. Goal setting
2. Stimulus control
3. Self-monitoring
4. Rewards for reaching goals
5. Problem solving

A recent Cochrane review by Ells et al. (2018) examined the effectiveness of behavioural interventions to treat childhood and adolescent obesity, and found that this approach leads to relatively small reductions in body weight.15,16 Clinicians are now exploring other combinations of treatment through the development of novel dietary interventions as well as pharmacological and surgical interventions.

**Novel dietary interventions**

While usually incorporated in broader multicomponent lifestyle-based interventions, the inclusion of a dietary component is important, as "it can improve cardiometabolic outcomes in adolescents with obesity even in the absence of weight loss or changes in body composition."16 Below are a few dietary interventions to consider in the treatment of childhood and adolescent obesity.

**Stop/Traffic Light diet**

The Stop or Traffic Light diet, "categorises foods according to caloric density and uses these groups to guide intake frequency."16 This intervention labels food according to three colours – green, yellow and red – and guides the food intake according to their nutritional properties. Studies have shown that such an approach “can produce effective weight loss (BMI decreases range from 0.18 to 2.6 kg/m²), in adolescents in the short- to medium-term (6 months to 2 years).”16

**Macronutrient distribution**

Altering the nutritional profile of foods, by altering the protein, fat and carbohydrate levels, can improve “dietary adherence, weight-loss outcomes and cardiometabolic measures.”16 Different forms of macronutrient diet interventions exist, including low fat, low carbohydrate and high protein diets.16,17
Intermittent fasting and very low energy diets (VLED)

Intermittent fasting is “a diet regimen that cycles between brief periods of fasting, with either no food or significant calorie reduction, and periods of unrestricted eating. It is promoted to change body composition through loss of fat mass and weight, and to improve markers of health that are associated with diseases such as blood pressure and cholesterol levels.” While in recent years intermittent fasting has gained momentum as a popular diet approach for weight-loss in adults, “there have been no studies in children and, current studies in adults lack long-term intervention and follow-up period.”

Very low energy diets (VLED) have been defined as “a clinically supervised diet plan that involves eating about 800 calories a day or fewer. The diet involves replacing normal food with low-calorie shakes, soups, bars, or porridge containing milk. These diets should only be followed under medical supervision for a maximum of 12 weeks continuously, or intermittently with a low-calorie diet – for example, for two to four days a week.”

Currently, neither intermittent fasting or VLEDs are recommended among infants, children and adolescents.

Pharmacological interventions

Pharmacological interventions are not generally recommended for children and adolescents, and should only be considered as an adjunct to lifestyle and behavioural interventions in older children. France and Belgium do not recommend the use of medication in the treatment and management of childhood obesity, and in the UK pharmaceutical interventions are not recommended for children younger than 12 years.

Currently, the only medication approved by the FDA for use in the treatment of adolescent overweight and obesity is Orlistat. Prescribed following a careful patient-evaluation, “the child will be closely monitored by a specialist paediatrician experienced in treating children with this specific medication and who is working as part of a multidisciplinary team.” Similarly, Scotland recommends judicious use of Orlistat “for severely obese adolescents with comorbidities or those with very severe to extreme obesity, attending a specialist clinic. There should be regular reviews throughout the period of use, including careful monitoring for side effects.”

Spain also recommends the use of Orlistat among adolescents between 12 and 18 years under similar conditions, in cases where lifestyle and behavioural interventions were not effective. Spain also considers metformin as a potential pharmacological treatment for adolescents aged 12 to 18 years with obesity and insulin resistance or glucose intolerance.

Surgical interventions

The aim of surgical interventions in people with obesity is to “reduce weight and maintain any loss through restriction of intake and/or malabsorption of food.” In recent years, laparoscopic surgery has been a major development in the field of bariatric surgery, and is increasingly used for adolescents with extreme obesity and comorbidities. A list of considerations for France, the UK, Spain, and US recommendations can be found in table 2.
### Considerations for bariatric surgery in adolescents

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| **France** | In France, bariatric surgery should be considered as an option when lifestyle and behavioural interventions are not appropriate or unsuccessful. While it remains outside official recommendations, the Haute Autorité de Santé recommends bariatric surgery for adolescents if they fulfil the following four criteria from a physiological and psychological perspective:  
  - Be at least 15 years minimum (and, case-by-case, between 13 and 15 years).  
  - Achieve a satisfactory stage of bone growth and puberty (bone age greater or equal to 13 years for girls and 15 years for boys and Tanner IV development).  
  - Have a BMI greater than 35 kg/m$^2$ with at least one severe comorbidity or a BMI greater than 40 kg/m$^2$ with a major quality of life alteration.  
  - Have a psychological maturity that ensures the understanding of the risks of this type of surgery and their life-commitment to diet and lifestyle changes with therapeutic measures and a regular medical follow-up. |
| **UK** | The NICE Guidelines emphasise that bariatric surgery is not generally recommended for children, but may be considered under special circumstances and if the individual has achieved physiological maturity. In addition, all bariatric cases should meet the following criteria:  
  - They have a BMI of 40 kg/m$^2$ or more, or between 35 kg/m$^2$ and 40 kg/m$^2$ and other severe comorbidities that could be improved if they lost weight.  
  - All appropriate non-surgical measures have been tried but the person has not achieved or maintained adequate, clinically beneficial weight loss.  
  - The person has been receiving or will receive intensive management in a tier 3 service.  
  - The person is generally fit for anaesthesia and surgery.  
  - The person commits to the need for long-term follow-up. |
| **Spain** | In Spain, the Guía de Práctica Clínica sobre la Prevención y el Tratamiento de la Obesidad Infantojuvenil recommends bariatric surgery for adolescents only for those with severe obesity (BMI ≥40 kg/m$^2$) and severe comorbidities or with extreme obesity (BMI ≥50 kg/m$^2$), when weight management has failed through intensive interventions to modify lifestyles, independently of pharmacological treatment, over a period of at least six months. Bariatric surgery should only take place among physical and psychologically mature adolescents, conscious of the risks and benefits of surgery and who have the support of their family. |
| **Sweden** | According to Olbers et al. (2017), eligibility criteria for adolescent bariatric surgery in Sweden include:  
  - Be over 13 years old; with height and growth velocity beyond peak, pubertal Tanner stage > III  
  - Have a BMI ≥40, or ≥35 kg/m$^2$ with comorbidity,  
  - Have at least 1 year in formal, conventional weight loss programme |
| **USA** | The US Endocrine Society recommends bariatric surgery in older children under the following conditions:  
  - The patient has attained Tanner stage 4 or 5 pubertal development and final or near-final adult height, the patient has a BMI of >40 kg/m$^2$ or has a BMI of >35 kg/m$^2$ and significant, extreme comorbidities  
  - Extreme obesity and comorbidities persist despite compliance with a formal program of lifestyle modification, with or without pharmacotherapy  
  - Psychological evaluation confirms the stability and competence of the family unit  
  - The patient demonstrates the ability to adhere to the principles of healthy dietary and activity habits  
  - There is access to an experienced surgeon in a paediatric bariatric surgery centre of excellence that provides the necessary infrastructure for patient care, including a team capable of long-term follow-up of the metabolic and psychosocial needs of the patient and family. |

**Table 2. List of considerations for bariatric surgery in adolescents in selected countries**
COST

Significant costs are associated with childhood obesity and consequential diseases as they develop into adulthood. Across the EU, around 7% of annual national health budgets is spent on obesity-related diseases in all age-groups. While a number of studies have been conducted on the cost-effectiveness of childhood obesity prevention interventions, few countries have fully assessed the cost-effectiveness of childhood obesity treatment and management interventions.

In the UK, a modelling study assessing the cost-effectiveness of lifestyle interventions to treat overweight and obesity in children showed that the indicative costs per child ranged from £108 to £662, with a discounted cost per life-year gained of some £13,500. Based on these intervention costs, behavioural interventions to treat childhood obesity have the potential to be cost-effective, but the health and financial benefits may not appear until later on during adulthood.

Regarding the cost-effectiveness of bariatric surgery, the Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) study based in the US observed a 24% decrease in total body weight 3 years after surgery. Over 3-year follow-up bariatric surgery was not found to be cost-effective compared to no surgery, but results over 5-years showed the incremental cost-effectiveness ratio decreased to $91,032 per QALY, suggesting that bariatric surgery was potentially cost-effective in the longer-term.

KEY CONSIDERATIONS FOR CHILDHOOD OBESITY TREATMENT

In this section, we highlight a series of considerations for policymakers, CSOs and other stakeholders for the treatment of childhood obesity:

1. **Use multi-level, multi-component interventions**: Based on the results from systematic reviews, interventions that "combine the sufficient training and time for the staff delivering the intervention; compulsory regular moderate to vigorous exercise; and nutrition education for children and parents [...] would help manage weight in younger children and set healthy patterns of physical activity and diet in place." A holistic approach incorporating physical activity, diet and psychological components should be adopted to maximise the positive effects of an intervention. Additionally, it is essential to use multidisciplinary teams of trained and specialist healthcare professionals at community level, covering nutrition, physical activity and psychosocial factors.

2. **Develop tailored and targeted interventions**: To increase the impact of different treatment programmes, the designed interventions should be “family centred, culturally relevant” and ensure that the surrounding infrastructure facilitates physical activity and encourages healthy eating. Intensive interventions lasting at least six months are more effective. Physicians should consider cultural differences which may impact on adherence to an intervention.

3. **Include key behavioural change components**: Based on the NICE guidelines, behavioural interventions should include five key aspects: (i) stimulus control, (ii) self-monitoring, (iii) goal setting, (iv) rewards for reaching goals and (v) problem solving.
4. **Promote parental involvement**: Parents can “monitor and limit television use, role-model healthy behaviours, and provide access to recreation areas or recreational equipment.”\(^{13}\) Through their active involvement, parents have been identified as holding a central role in the reduction of their child’s BMI.\(^{33,36}\)

5. **Equitable access to treatment**: Health services should provide universal and equitable access to treatment and follow-up services. There is overwhelming evidence of disparities in obesity prevalence, and the causes of these disparities are likely to be linked to the success or failure of pediatric treatment. Use of weight management and obesity treatment services is likely to be affected by parental attitudes to overweight in children, their understanding of the underlying causes of weight gain, their motivation to make family-level changes, and above all the resources they may have available to make and maintain these changes. Interventions need to be culturally and socially sensitive, avoiding stigma, encouraging motivation, recognising barriers and reinforcing opportunities.

6. **Use innovative follow-up techniques**: Given that obesity is a chronic disease, many years of follow-up may be necessary to identify the effectiveness of an intervention focused on children.\(^6\) “Computer mediated treatment programmes may offer a cost-effective alternative to traditional and expensive face-to-face methods and should be considered, particularly in light of the growing computer usage among children.”\(^{34}\) Additionally, it is also important to establish a follow-up plan to monitor the transition into adulthood.

7. **Use pharmacological treatment with caution**: When selecting a pharmacological treatment option, “age, growth and intellectual maturation are distinct features between children, adolescents and even adults that need to be taken into account.”\(^8\) The administration of pharmacological treatment should be undertaken as a complementary measure to lifestyle and behavioural interventions.

8. **Consider bariatric surgery as an exception**: If lifestyle interventions are inefficient, bariatric surgery can be considered for post-pubertal adolescents suffering severe to extreme obesity as well as severe comorbidities, and provided that a set of pre-defined criteria are met.\(^4\) It is important to provide care pathways for children with weight difficulties, including family-based interventions, through bariatric surgery.

9. **Consider the use of more intensive dietary interventions**: Studies have shown that the use of more intensive dietary interventions can lead to modest weight loss among adolescents with obesity, while also improving cardiometabolic outcomes.\(^{16}\)
CONCLUSION

The aim of this policy brief is to provide guidance to policymakers and other key stakeholders to support successful childhood obesity treatment and management interventions. It summarises the information available through the World Obesity’s policy dossier, which also contains summaries of evidence and several case studies. The present briefing highlights the need to develop multi-component interventions combining dietary, physical activity and behavioural techniques as well as encouraging family and parental involvement. Under specific circumstances and following a set of professionally-recognised criteria, intensive dietary interventions, pharmacological treatment and bariatric surgery can be considered for children above the age of 12 years.
REFERENCES


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