Best practice

Fifteen-minute consultation: The child with obesity

Allison Low 1, Sophie Parry-Okeden 2, Elspeth Clare Ferguson 1, Neil Wright 1, Charlotte Jane Elder 1,3

1 Paediatric Endocrinology and Diabetes, Sheffield Children’s NHS Foundation Trust, Sheffield, UK
2 Community Child Health, Sheffield Children’s NHS Foundation Trust, Sheffield, UK
3 Academic Unit of Child Health, University of Sheffield, Sheffield, UK

Correspondence to
Dr Allison Low, Paediatric Endocrinology and Diabetes, Sheffield Children’s NHS Foundation Trust, Sheffield S10 2TH, UK; allison.low@nhs.net

Received 19 January 2021
Revised 22 March 2021
Accepted 29 March 2021

ABSTRACT

Obesity is common among children and young people, with potential for significant clinical consequences. The physical and psychological comorbidities associated with childhood obesity persist into adult life, but many children do not have access to tailored obesity services. We present a framework for the identification, assessment and management of childhood obesity by the non-specialist. We also offer strategies to initiate discussions about weight and to communicate effectively with patients living with obesity.

INTRODUCTION

Childhood obesity is one of the most serious public health challenges of the 21st century, with rates increasing 10-fold over the last 40 years. In England, 23% of children starting school and 34% of children aged 10–11 years are classified as overweight or obese. In the UK, obesity is twice as prevalent in the most deprived populations compared with the least deprived, while in low-income countries this association is reversed.1 The definitions of obesity are listed in table 1. The development of obesity is complex: societal and economic factors combined with global trends for increased sedentary behaviours and consumption of energy-dense food all play a role.

Childhood obesity leads to adult obesity with increased risk of poor health outcomes and premature death. Type 2 diabetes and hypertension are increasingly seen in children, and the psychosocial impact on children’s quality of life includes low self-esteem, depression and bullying.1 Weight bias can lead to lower expectations from teachers, decreased school attendance and fewer friends.1 Perceived benefits of obesity can be a barrier to intervention and include protection against bullying for some, being seen as a sign of health or being valued in some communities.

This paper aims to support the identification of obesity that requires onward referral: obesity with suspicion of an underlying cause or with significant comorbidities. However, as the majority of obesity is nutritional in origin, this paper also focuses on the assessment and management of patients whose obesity is not caused by an underlying medical problem.

Presentation of childhood obesity

In the UK, children with obesity may be identified through the National Child Measurement Programme which records height, weight, and body mass index (BMI) for every child in Reception (aged 4–5 years) and Year 6 (aged 10–11 years). Clinicians should also identify obesity opportunistically by recording and reviewing BMI each time a child is in contact with health services.

COMMUNICATION

A significant proportion of healthcare consultations are likely to be with children with overweight or obesity. Neither parents nor healthcare professionals reliably recognise overweight status in children,2 limiting the opportunities for acknowledgement and support towards lifestyle change. Discussing weight status is an area that healthcare professionals find difficult, citing lack of time or knowledge and concern about preserving patient relationships. Public Health England’s framework Let’s Talk About Weight uses motivational interviewing principles to support the person making the behaviour change to identify their own solutions,3 and the online Moving Medicine resource (movingmedicine.ac.uk) uses a similar approach with short conversations tailored to children and young people with obesity.
Experiences of weight-related stigma can be a barrier to seeking medical attention for obesity-related concerns, leading to a cycle of disengagement from medical services and worsening health outcomes. Awareness of language and communication can significantly change the way that a person with obesity experiences the consultation and increase their likelihood of engaging in behaviour change. It is particularly important to create a non-judgemental environment, show empathy, and avoid generalisations or assumptions. Further recommendations are described in box 1.

**CLINICAL ASSESSMENT**
The clinical assessment of the child with obesity focuses on three areas: identifying patients who require investigation for an underlying cause of obesity, screening for comorbidities and seeking modifiable lifestyle risk factors.

### Identifying patients with a possible underlying diagnosis
Red flags for obesity with an underlying cause include rapid weight gain in infancy, hyperphagia and short stature (Table 2). Possible indicators of hyperphagia include waking at night to eat, demanding food relentlessly, stealing food, eating frozen, dirty or uncooked food, and disruption of normal daily activities by food-seeking behaviour. Abnormal development or dysmorphic features may point towards an underlying syndrome.

Obesity clusters in families, although a family history of severe early onset obesity can point towards a genetic cause. Short stature should raise suspicion of an endocrinopathy, while children whose obesity is not caused by an underlying syndrome often have a tendency towards slightly taller stature than their normal-weight peers until attainment of final adult height. Small for gestational age infants can show rapid catch-up growth in infancy and subsequent childhood/adulthood obesity. Puberty in obese children may be earlier than average but precocious puberty is not expected.

Genetic testing (available through the University of Cambridge Metabolic Research Laboratories; www.goos.org.uk) is recommended in patients with extreme obesity before 5 years of age, extreme hyperphagia, a family history of extreme obesity and where bariatric surgery is being considered. Other investigations may be indicated where there is a suspicion of a specific underlying cause (Table 2).

### Screening for comorbidities
Assessment for comorbidities should be considered in children with BMI ≥98th centile or z-score >2 (Table 3). A family history of type 2 diabetes, cardiovascular disease or hyperlipidaemia increases the metabolic risks associated with childhood obesity. Acanthosis nigricans, an indicator of insulin resistance, is most easily seen at the base of the neck, axilla or groin.

### Seeking modifiable lifestyle risk factors
In the history, asking about dietary habits, exercise, screen time and sleep can help identify which lifestyle change goals are most suitable for the individual child and family (see box 2). A dietary history includes but is not limited to drink preference, snack preference, after-school eating and eating that takes place during screen time (‘grazing’). A dietary history over the previous 24-hour period can be useful. It is likewise important to recognise barriers to lifestyle change that may exist, including financial pressures, limited local availability of fresh food, and parents/carers who work unsocial hours or who are not able to cook.
Best practice

MANAGEMENT

Obesity services in the UK are commissioned in four tiers (figure 1), with tier 1 encompassing universal services provided by general practitioners, health visitors and school nurses. Tier 2 services are commissioned and run by local councils, offering multicomponent interventions to promote healthy eating habits and physical activity, reduce sedentary time, and offer behaviour change strategies such as stimulus control and goal setting. Tier 3 services are specialist multidisciplinary paediatric obesity health services able to offer dietetic advice, pharmacological management, and, in some centres, psychological support. Supra-specialised tier 4 services manage patients who are candidates for bariatric surgery.

Access to services across all tiers varies according to geographical location. Children living in areas without access to tier 2 or 3 services may rely on general paediatric or endocrinology input for management of obesity. Other non-specialists able to support the family include parenting groups, youth support workers and family support workers.

Weight maintenance versus weight loss

In most children who have not yet achieved their final height, weight maintenance rather than weight loss is

| Table 2 | Underlying causes of obesity |
|---------|------------------------------|
| Cause   | Suggestive features          |
|---------|------------------------------|
| Endocrinopathy | Children with an endocrinopathy demonstrate poor linear growth and short stature (relative to mid-parental height and target centile range) in combination with overweight/obesity. |
| Hypothyroidism | Hypothyroidism can contribute to weight gain, but note that a mildly raised TSH (<10 mIU/L) is common in obesity. In the absence of positive thyroid peroxidase antibodies and with a normal FT4, isolated mild raised TSH is not suggestive of hypothyroidism and treatment is not recommended. |
| Cushing’s syndrome | Arrested growth is a key feature. Associated features such as a short history of obesity, rapid weight gain, lack of family history and virilisation may also be present. |
| Genetic | Children with genetic causes of obesity typically have early onset of severe obesity, with rapid weight gain in infancy. Syndromic and monogenic causes should be considered. |
| Syndromic obesity | Includes Prader-Willi syndrome, Bardet-Biedl syndrome. Additional syndromic features such as hypotonia, poor feeding in infancy and learning difficulties may be present. |
| Monogenic obesity | Includes melanocortin 4 receptor deficiency and leptin deficiency. Associated features such as severe hyperphagia, developmental delay, sensorineural deafness, abnormalities of the eyes, hypoglycaemia or intestinal dysfunction may suggest a monogenic cause. |
| Polygenic obesity | Many single nucleotide polymorphisms have a very small effect on an individual’s predisposition to overweight/obesity. Each variant present adds to an individual’s cumulative risk of obesity. |

| TSH, thyroid-stimulating hormone. |

| Table 3 | Screening for comorbid conditions |
|---------|----------------------------------|
| Comorbid condition | Investigation |
| Hypertension | Diagnose hypertension if serial measurements with an appropriately sized cuff (ideally including manual measurements) are ≥95th centile for age, sex, and height OR if the blood pressure is ≥130/80 in children aged 13 years and over. |
| Adverse lipid profile | If abnormal fasting LDL/HDL and cholesterol can prompt personalised discussions about the health consequences of obesity and support dietetic input. In the absence of familial hypercholesterolaemia, pharmacological treatment of hyperlipidaemia is unusual in young people but should be considered. |
| Type 2 diabetes and insulin resistance | HbA1c values of ≥48 mmol/mol indicate diabetes. Fasting insulin and glucose can be used to gauge insulin resistance by the HOMA score. Fasting plasma glucose (mmol/L)×fasting plasma insulin (mIU/L)/22.5 Patients with a HOMA score ≥4.5 signs or symptoms of insulin resistance, an HbA1c of 42–47 mmol/mol or considered high risk should undergo a full oral glucose tolerance test. |
| Non-alcoholic fatty liver disease (NAFLD) | Children with severe NAFLD are likely to have a raised alanine transaminase. Mild NAFLD may present with normal liver function tests and only be detectable on imaging including elastography. |
| Sleep apnoea | Consider sleep apnoea in children with a history of nocturnal gasping, snoring or frequent waking alongside daytime somnolence, headache, and difficulty concentrating. Poor quality sleep also negatively impacts daytime lifestyle. |
| Polycystic ovary syndrome (PCOS) | PCOS should be diagnosed with caution: mild hirsutism and menstrual irregularities are common in adolescence. Consider PCOS where there is clinical and biochemical evidence of hyperandrogenism alongside menstrual irregularities. |
| Psychological distress | Ask about friendship groups, bullying, mood and self-harm. |

This is not an exhaustive list and additional specific tests may be required. HbA1c, glycated haemoglobin; HDL, high-density lipoprotein; HOMA, Homeostatic Model Assessment; LDL, low-density lipoprotein.
Best practice

Box 2  Brief suggestions for weight management goal-setting

Dietary changes
- Limit snacking, grazing and food between main meals.
- Increase vegetable and fruit intake (at least five portions a day).
- Eliminate or reduce soft drinks and fruit juices.
- Pay attention to age-appropriate portion sizes—try smaller plates.
- Reduce frequency of takeaways and ready meals.
- Avoid keeping energy-dense food at home (eg, biscuits, sweets, chocolate, crisps).
- Discourage second helpings.
- Have regular family mealtimes and avoid combining meals with screen time.
- Recognise cues for snacking (eg, boredom, stress).
- Slow the pace of eating to allow time for satiety signals to develop.
- Advise parents/carers to avoid using food as a reward.

Exercise/activity
- Use active transport to get to and from school (walk, cycle, scoot).
- Plan physical activity as a family (eg, weekend cycles or walks).
- Decrease sedentary and screen time.
- Use active transport to get to and from school (walk, cycle, scoot).
- Plan physical activity as a family (eg, weekend cycles or walks).
- Join sports clubs or training sessions.

Other
- Encourage good sleep hygiene.

Children/families can choose two to three of these goals to focus on at a time. Management is most likely to be successful if the whole family works towards the same goals.

Figure 1  Obesity services for children.

advised. However, pre-pubertal children with severe obesity should be supported to lose weight. Likewise, young people with obesity who have completed growth should aim to lose weight, usually between 0.5 and 1 kg per month. 8

Diet and exercise
Lifestyle advice should focus on both dietary alterations and physical activity (box 2). Goals should be realistic and can be revisited on consecutive appointments rather than attempting a complete lifestyle overhaul at once.

General principles of the dietary management of obesity in children are the avoidance of extremely restrictive or ‘fad’ diets and the promotion of sustainable healthy eating patterns. Although specialist units may offer individualised recommendations (including very low-calorie diets or low carbohydrate/low glycaemic index diets), most general units should provide dietary advice in line with national guidance (eg, the UK Eatwell Guide) alongside a discussion of age-appropriate portion sizes. 9

Although a calorie-based approach to weight management is not advocated by the National Institute for Clinical Excellence (NICE), 6 some families may request advice about recommended daily calorie consumption for their child. The 2011 Dietary Reference Values for Energy report details estimated energy requirements by age, sex and activity levels. 10

The benefits of physical activity exceed simple energy expenditure and include improvements in both physical and mental health. Children between 1 and 4 years are advised to spend 180 min of the day physically active. 11 At least 60 min per day of moderate-vigorous physical activity (exercising to the point of feeling warmer and breathing faster) is recommended for school-age children. 11 Advice about physical activity needs to be tailored to the individual, with consideration of possible mobility limitations or musculoskeletal issues.

In addition to formal physical exercise, families can explore ways to build more physical activity into their everyday lives such as walking to school, engaging in active play, or using stairs rather than lifts and escalators. Screen and sedentary time should also be limited to a maximum of 2 hours per day or 14 hours a week. 8

Medication
NICE suggests that drug treatment can be considered in children over 12 years with significant physical or psychological comorbidities under specialist supervision. 6 Drug treatment under 12 years of age is only considered in the presence of severe comorbidities. Medications that may contribute to weight loss are listed in table 4.

Surgery
Bariatric surgery in young people is effective, leading to clinically significant weight loss and reduction of type
2 diabetes and other comorbidities. With concerns about surgical morbidity and effect on growth and puberty, it is only considered in exceptional circumstances. Candidates must also have a BMI over 40 (or over 35 with significant comorbidities) despite all other available management and have reached or nearly reached physiological maturity.\(^6\)

### Referral to other services

Reduction of BMI is the most effective means of improving obesity-related comorbidities. Children with features suggestive of obesity with an underlying cause (table 2) or evidence of significant comorbidities (including sleep apnoea, non-alcoholic fatty liver disease with significantly or persistently raised alanine transaminase, type 2 diabetes) should be referred to the appropriate specialist service. If significant psychological distress such as anxiety or depression is identified at any stage, onward referral for psychological support is indicated. Referral to eating disorders services should be arranged if binge-eating has been identified.

### Safeguarding

A framework for practice published in 2010 suggests that neither obesity nor failure to lose weight is a safeguarding concern in itself. However, consistent failure to engage in services (particularly where there is comorbidity) or wider concerns about neglect should prompt safeguarding discussions.

### CONCLUSION

Recognition and management of obesity in children is essential. Consequences of childhood obesity persist into adulthood and impact physical health, social functioning and psychological well-being. Communication must be carefully managed, using non-judgemental language and recognising that families and children may feel apprehensive or defensive when discussing weight.

In the absence of signs suggesting an underlying cause of obesity, investigations for most patients focus on the detection and management of clinical consequences of obesity.

Lifestyle change is key, with engagement of the whole family and/or household to support modification of diet and increased exercise in the long term. Working together with children, young people and their families, paediatricians can play an important role in supporting changes to promote lifelong health for patients with obesity.

### REFERENCES

1. Public Health England. Childhood obesity: applying All Our Health. Public Health England, 2020. Available: https://www.gov.uk/government/publications/childhood-obesity-applying-all-our-health/childhood-obesity-applying-all-our-health. [Accessed Dec 2020].

2. Ruiter ELM, Saat JJEH, Molleman GRM, et al. Parents’ underestimation of their child’s weight status. Moderating factors and change over time: A cross-sectional study. PLoS One. 2020;15:e0227761.

3. Public Health England. Let’s Talk About Weight: A step-by-step guide to brief interventions with children and families for health and care professional. London: Public Health England, 2017. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/649095/child_weight_management_lets_talk_about_weight.pdf
4. Albury C, Strain WD, Brocq SL, et al. The importance of language in engagement between health-care professionals and people living with obesity: a joint consensus statement. *Lancet Diabetes Endocrinol* 2020;8:447–55.

5. Styne DM, Arslanian SA, Connor EL, et al. Pediatric Obesity: Assessment, treatment, and prevention: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2017;102:709–57.

6. National Institute of Clinical Excellence. Obesity: identification, assessment and management [Internet]. National Institute of Clinical Excellence, Clinical guideline 189, 2014. Available: https://www.nice.org.uk/guidance/cg189 [Accessed Dec 2020].

7. National Institute of Clinical Excellence. Weight management: lifestyle services for overweight or obese children and young people National Institute of clinical excellence. Public health guideline 47, 2013. Available: https://www.nice.org.uk/guidance/ph47 [Accessed Dec 2020].

8. Scottish Intercollegiate Guidelines Network. *Management of obesity guideline 115*. Edinburgh: Scottish Intercollegiate Guidelines Network, 2010. https://www.sign.ac.uk/assets/sign115.pdf

9. Public Health England. The Eatwell Guide. Public Health England, 2018. Available: https://www.gov.uk/government/publications/the-eatwell-guide [Accessed Mar 2021].

10. Scientific Advisory Committee on Nutrition. *Dietary reference values for energy*. London: Scientific Advisory Committee on Nutrition, 2011. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/339317/SACN_Dietary_Reference_Values_for_Energy.pdf

11. Department of Health and Social Care. Chief medical officers' physical activity guidelines. Department of Health and Social Care, 2019. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf [Accessed Dec 2020].

12. Inge TH, Courcoulas AP, Jenkins TM, et al. Weight loss and health status 3 years after bariatric surgery in adolescents. *N Engl J Med* 2016;374:113–23.

13. Viner RM, White B, Barrett T, et al. Assessment of childhood obesity in secondary care: OSCA consensus statement. *Arch Dis Child Educ Pract Ed* 2012;97:98–105.

14. Viner RM, Roche E, Maguire SA, et al. Childhood protection and obesity: framework for practice. *BMJ* 2010;341:c3074.

15. World Health Organization. Obesity and overweight. World Health Organisation, 2020. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight [Accessed Mar 2021].

16. Kelly AS, Barlow SE, Rao G, et al. Severe obesity in children and adolescents: identification, associated health risks, and treatment approaches: a scientific statement from the American Heart Association. *Circulation* 2013;128:1689–712.

17. Niranjan U, Wright NR. Should we treat subclinical hypothyroidism in obese children? *BMJ* 2016;352:i941.

18. Czernichow S, Lee CMY, Barzi F, et al. Efficacy of weight loss drugs on obesity and cardiovascular risk factors in obese adolescents: a meta-analysis of randomized controlled trials. *Obes Rev* 2010;11:150–8.

19. Kelly AS, Auerbach P, Barrientos-Perez M, et al. A randomized, controlled trial of liraglutide for adolescents with obesity. *N Engl J Med* 2020;382:2117–28.

20. Yanovski JA, Krakoff J, Salata CG, et al. Effects of metformin on body weight and body composition in obese insulin-resistant children: a randomized clinical trial. *Diabetes* 2011;60:477–85.