

Childhood Obesity

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Abstract

Childhood obesity is a serious global health problem. It begins early in life during the preschool years, and for many, obesity is carried forward into later childhood and adult life. Once established, obesity is difficult to reverse and is associated with poorer health outcomes in the short- and long-term. Tackling obesity in childhood is important to reduce lifelong risk and protect health. However, in the UK and other countries service provision is lacking. Interventions that are successful in the prevention and management of childhood obesity are urgently needed. Ideally, these should be evidence based and target the youngest children and their families.

Keywords Obesity, overweight, diet, physical activity, preschool, childhood, lifestyle interventions

Introduction

Obesity is a disease of modern life that begins in early childhood. In the UK more than one in five children are overweight on starting school ¹. This is a concern as obese children have a higher risk of diseases including asthma and type 2 diabetes and are reported to have low self esteem. Once established obesity tracks into adulthood and is associated with increased risk of cardiovascular disease and certain cancers. Therefore, reducing obesity is an important public health goal. This article considers the possible causes of childhood obesity, how to identify children at risk, implications for health, prevention strategies and treatment options. Given that obesity has its antecedence in early childhood, the focus is on this age group.

Causes of obesity

In simple terms, obesity is the result of an energy imbalance. A strong genetic tendency is indicated by the co-existence of obesity in family members. However, external factors are key and obesity is widely accepted to result from interactions between genes and environment. Diet and physical activity, the risk factors most strongly related to obesity, have changed markedly since the onset of the obesity epidemic. This has helped produce an 'obesogenic' environment where susceptible individuals are more likely to become overweight. An abundance of energy dense foods, larger portion sizes and more frequent episodes eating away from the home have contributed to excessive energy intake in many individuals. At the same time increased use of cars and labour saving devices has led to lower physical activity and more time spent sedentary. Collectively, these behaviours favour a positive energy balance that has contributed to the epidemic.

Once established, obesity is hard to reverse, thus, prevention is likely to be the most effective strategy. Interventions to prevent obesity should begin early and address known risk factors. Preschool children, their parents and other caregivers, are the main targets for interventions.

Box 1 KEY Points

Risk factors for obesity

While lifestyle is the main driver of adult obesity, developmental factors have recently been identified as important influencers in early life². Factors most strongly associated with obesity include infant feeding, rapid early growth (upward centile crossing) and less healthy dietary behaviours.²

Infant and young child feeding

Breastfeeding is associated with a lower risk of obesity³. This may be due partly to the slower growth pattern of breastfed compared with formula fed infants. Faster growth in formula fed infants is partly due to overfeeding; infant formulas are higher in protein and energy than breast milk and infants fed by bottle consume more milk than those breastfed. Responsive breastfeeding and formula feeding, where a mother responds appropriately to her infant's cues of hunger and satiety, are protective strategies against obesity development.

Timely and appropriate introduction of solid foods is important in managing obesity risk. Dietary habits established here are carried into later childhood. Less healthy dietary patterns, high in refined foods and low in fruits, vegetables and fibre, are linked to increased risk of obesity. Earlier introduction (before 4 months of age) is associated with a higher risk of obesity compared with later introduction (around 6 months of age).

Preschool is a pivotal period when lifestyle behaviours continue to develop and are taken forward into later life. Studies and dietary surveys report that diets of preschool children do not meet recommendations. High intakes of protein, sugar sweetened beverages, infant formula and cow's milk and unhealthy dietary patterns have all been linked with increased risk of later obesity.

Physical activity and sedentary behaviour

Low levels of physical activity and increased sedentary behaviour are strongly associated with increased risk of chronic conditions including obesity. In the UK and many other countries it is recommended that preschool children should be physically active for 3 hours daily and school aged children should take part in moderate to vigorous intensity activity for a least 60 minutes every day. However, many children do not reach these goals.

Establishing a healthy lifestyle during the preschool years is important for obesity prevention.

Assessment of obesity in infants and children

Body mass index (BMI) centiles are not appropriate for clinical assessment of obesity in children under 2 years of age. In this age group, weight for height for age and gender at or above the 95th centile indicates increased risk. Weight and height should be measured using calibrated equipment and plotted on an appropriate growth reference. Charts are available including the UK-WHO growth chart 0-4 years and the UK growth chart 2-18 years⁴. Based on the UK reference, in children above 2 years of age BMI at or above the 91st centile signifies overweight and BMI at or above the 98th centile defines obesity.

Referral and management

Parents of infants and children at high risk of becoming overweight according to the criteria in Table 1 can be managed in primary care. Careful questioning is needed to assess risk factors and guide management. Following assessment tailored advice to achieve a healthy lifestyle can

be provided. In growing children the aim is to slow weight gain, rather than to reduce body weight. Regular monitoring is essential to support healthy growth and development.

Table 1: Risk assessment and management of obesity in infants and children

Interventions to prevent obesity

The UK National Institute for Health and Care Excellence (NICE) recommends community based multi-component interventions targeting diet, physical activity and behaviour change as the best strategy for obesity prevention in children. Interventions are most effective in younger children (age ≤ 6 years)⁵. Programmes should include at least one other family member and can be accessed by self referral or via primary care practitioners. However, very few evidence based programmes are available and only a small number target preschool children. Planet Munch is one such healthy lifestyle programme with evidence to show it is effective in reducing obesity risk in preschool children.

Planet Munch, also known as Trim Tots, was developed to meet the UK NICE guideline CG189 (Figure 1). Planet Munch is a 24-week multi-component programme with an emphasis on family participation and learning through art and play. The intervention has been evaluated in two small scale randomized controlled trials. The first trial tested the intervention in a high risk population, already overweight or at increased risk; the second was carried out in the general preschool population. In trial 1, BMI was lower in the intervention group following participation compared with waiting list controls (mean difference in BMI z-score: -0.9; 95% CI: -1.4 to -0.4, P = 0.001). This was sustained in 39 children followed up 2 years later when BMI was lower compared with baseline (mean difference in BMI z-score: -0.3, 95% CI: -0.6 to -0.1, P = 0.007). In trial 2, BMI was lower in the intervention group compared to controls immediately following participation (mean difference in BMI z-score: -0.3; 95% CI: -0.8 to 0.3, P = 0.3).

In England almost a quarter of under 5s are already overweight and severe obesity in children in year 6 (aged 10-11 years) has reached the highest point since records began. Thus, there is an urgent need for obesity management services for families and children. The LEAF programme has been successful in managing obesity in the early years.

Lifestyles, Eating and Activity for Families (LEAF) programme

LEAF was developed to treat childhood obesity in line with NICE guideline CG189 (Figure 1). The programme is available to families of young children (≤ 6 years) living in Cornwall and the Isles of Scilly, who are severely obese. LEAF supports and empowers families to lead healthier lifestyles. Families in areas of high deprivation are prioritized due to a strong association between socioeconomic status and obesity.

An initial home visit is made by the team's paediatric dietitian and physical activity advisor. This allows assessment of lifestyle behaviours and the family's motivation to change. Following this, a full assessment including anthropometry, beverage consumption, physical activity level, sedentary time and sleep patterns is carried out by the multi-disciplinary team (including a paediatrician) in a clinic setting.

Community group workshops are held at local centres (Table 2). All family members can attend and a crèche is provided to encourage engagement. Workshops of 3 hours duration are delivered by the dietitian and physical activity advisor. Families unable to attend are offered support at home.

A review takes place three months after completing the workshops. Families who have achieved a healthier lifestyle, evidenced by a reduction in BMI and beverage consumption and increased physical activity, and who are confident to continue with changes made, are referred back to the primary care team. BMI data are reported back to the MDT for monitoring and further intervention if necessary. If there is no clinically significant reduction in BMI families are offered further support.

Evaluation of LEAF programme

The LEAF programme was evaluated in 76 children and found to be effective in reducing BMI (mean difference in BMI z score: -0.4; 95% CI: 0.3 to 0.6; P < 0.001). 46 children completed 2-day beverage diaries. Energy from beverages was lower following participation (median pre-: 326 kcal/d; SE = 334 and post-intervention: 134 kcal/d, SE = 104; z = -4.77, P < 0.001).

Summary

Multi-component lifestyle programmes are strategies that can help reduce the risk of childhood obesity. These should be tailored to meet the needs of families and children and should ideally begin in infancy and continue through the preschool years to maximize the chance of success.

Wordcount 1556

Key References

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TEST YOURSELF

Question 1

Chloe, a little girl aged 3½ years is referred to you. She was seen by her health visitor as Mum was concerned that she was "getting fat". The health visitor had measured and plotted her growth on the UK-WHO 0-4 years growth chart. Her BMI was just above the 91st centile. Which of the following statements is true.

- a) Chloe is obese
- b) Chloe is overweight
- c) Chloe's weight is normal
- d) d) Chloe should be weighed again in 6 weeks

Question 2

Chloe's mum comes to see you again in 6 months time as she is still concerned. Chloe's weight is now between the 91st and 98th centile and her height is on the 25th centile. What should you do now?

- a) Reassure mum and the health visitor that there is still no cause for concern
- b) Advise that she will grow into her body fat
- c) Use her height and weight measurements to plot her BMI
- d) Assess her dietary intake and physical activity level

Question 3

Chloe's BMI is on the 91st centile. What should you do next?

- a) Provide advice on diet and physical activity
- b) Refer to a dietitian
- c) Refer to a Tier 3 weight management programme
- d) Refer to a Tier 2 weight management programme