

Evidence base for the prevention and management of child obesity

Wendy Robertson
Marie Murphy
Rebecca Johnson

Abstract

Obesity in childhood is a public health priority. The prevalence of overweight and obesity in children has increased since the mid 1990s, although prevalence is now stabilising. The National Child Measurement Programme shows that a third of 10–11 year olds in England are currently overweight or obese. Obesity increases the risk of poor physical health and mental health in childhood, and children who are obese are more likely to be obese in adulthood. Four tiers of services are recommended in the care pathway: universal prevention services; lifestyle weight management services often run in the community; specialist support from a clinical team; and surgery (in exceptional circumstances to over 12s). The current evidence on prevention indicates that interventions targeting schools and the home are promising, and reducing free sugar intake and sugar sweetened drinks is fast becoming a policy imperative. The evidence of the effectiveness of tier 2 weight management services is mixed, indicating that childhood obesity is hard to treat. Future research is turning to a whole systems approach to tackle childhood obesity. In this article we aim to outline how childhood obesity is measured, the scale of the problem globally and in the UK, the determinants and the consequences of childhood obesity. We will then give an overview of prevention and treatment interventions.

Keywords childhood obesity; epidemiology; prevention; weight management

Introduction

The prevention and management of childhood obesity is now a public health priority. Obesity in childhood increases the risk of poor physical health and mental health in childhood, and there is evidence that it is linked to a number of physiological and psychological health risks in adulthood.

Wendy Robertson PhD MPH FFPH is an Associate Professor in Public Health, Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK. Conflict of interest: none declared.

Marie Murphy MSc is a Doctoral Researcher, Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK. Conflict of interest: none declared.

Rebecca Johnson PhD MPH is a Research Fellow, Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK. Conflict of interest: none declared.

Defining obesity in children

The most commonly used method of classifying children as overweight or obese is body mass index (BMI) plotted on a reference chart, allowing a child to be compared to a reference population based on age and sex. BMI is not a direct measure of body fat, however it correlates reasonably well with adiposity and is a practical tool, which can be implemented easily, accurately and non-invasively.

There is no agreed definition of overweight and obesity in children, with a number of reference charts for BMI in use in the UK depending on the purpose. For clinical settings, the National Institute for Health and Care Excellence (NICE) recommends the UK 1990 Growth Reference Curves (UK90) with cut-offs at the 91st and 98th centiles for overweight and obesity respectively. BMI 'population monitoring' cut-offs are used for the purpose of estimating population prevalence and trends in weight status, with overweight set at the 85th centile and obesity set at the 95th centile.

Other measures of body fat in children include anthropometric measures such as waist circumference, waist–hip ratio, and skinfold thickness, and direct measures such as body scanning and density-based methods. These methods measure the degree of adiposity more accurately, but some are impractical in a clinical setting and tend to be restricted to research settings. A limitation of BMI compared to direct measures is that it may differ in its diagnostic accuracy across ethnic groups due to differences in body composition, for example underestimating adiposity in South Asian children. However, ethnic-specific cut-offs are not yet recommended in children as they are in adults.

One barrier to combating the issue of obesity in children is that many parents fail to recognise the condition in their own children. In an investigation of parental perceptions of their child's weight status, parents tended to only classify their children as 'overweight' when it was present in the extreme (99.7th centile). Further compounding the issue is that even when parents are informed of an assessment of overweight or obesity in their child, it is not always viewed unfavourably or as a health concern.

UK prevalence and trends

The scale of the problem of childhood obesity is large and persistent – the World Health Organization reports that if current trends continue, 70 million children will be affected globally by 2025. In England, recent evidence from the Health Survey for England suggests that the trend for rising prevalence of childhood obesity is now stabilising, as demonstrated in [Figure 1](#). Levels of obesity peaked in 2004–5 and have significantly declined in recent years for younger children, yet absolute levels remain high. There is still some way to go to achieve the government's target of a sustained downward trend in childhood overweight and obesity by 2020.

The National Child Measurement Programme (NCMP) for England is a surveillance programme that has collected the height and weight of primary school children at reception (4–5 years) and year six (10–11 years) annually since 2006/7. A similar programme was established in Wales in 2011, measuring only reception year children. The NCMP is operated on an opt-out basis, in which parents can withdraw their children, but

participation is very high with 94% of eligible children measured for the period 2013/14, amounting to 1.1 million children nationally in England. This allows for robust estimations of prevalence and trends. The programme is also used by local authorities to inform parents of their child's weight status and as a component in local obesity care pathways.

Whilst Scotland and Northern Ireland do not have an equivalent programme, the national Health Surveys provide some insight into childhood obesity for these countries, although the results are not directly comparable to those for England and Wales due to differences in methods. A summary of national prevalence of childhood overweight and obesity can be found in [Table 1](#).

In England, analyses by geographical area, level of deprivation and ethnic group show stark disparities in the proportion of overweight and obese. In 2013/14, the South East region had the lowest levels of overweight and obesity for both reception and year six children at 20.5% and 30.3% respectively, whilst the North East had the highest for reception children at 24.4%, and London for year six children at 37.6%. There is a linear relationship between obesity and deprivation, with more than double the prevalence of childhood obesity in the most deprived 10% of neighbourhoods versus those in the least deprived 10% and a trend of widening inequalities over the last seven years of the NCMP data collection (Reception: 12.1% versus 6.0%. Year 6: 24.6% versus 11.8%).

White British children have lower rates of obesity than other ethnic groups, even once potential confounding factors such as deprivation are accounted for. Children of Black, Pakistani and Bangladeshi ethnicity are at higher risk, for example year six children of Black or Black British ethnicity had an overweight and obesity prevalence of 43.7% in 2013/14, compared to 31.8% in White British children.

Risk factors/determinants

Obesity occurs when caloric intake is greater than caloric expenditure. Yet the determinants of obesity are many and varied. Obesity (in children and adults) is a multi-factorial

condition. Childhood obesity is influenced by a combination of biological, behavioural, generational, social, economic and cultural factors. The Foresight Report on Tackling Obesities in 2007 identified a number of key determinants of overweight: biology, growth patterns early in life, behaviours around eating and physical activity, activity and food environments, and broader economic and societal influences.

Biological factors of obesity include genetic and metabolic factors. Animal and human research have identified specific genes associated with obesity, however obesity caused by genetic factors is mainly syndromic e.g. Prader–Willi. This field of research has revealed that the hormone leptin plays a central role in the control of energy intake, as well as the melanocortin system. The predisposition to obesity is likely to be caused by the interaction of at least 250 genes associated with obesity.

Prenatal over-nutrition might also affect the risk of obesity later in life, and there is evidence to suggest that early feeding and weaning practices can affect childhood and later weight and growth trajectories. For example, some evidence suggests that breast-fed babies have slower growth rates than formula-fed babies and this may be a contributing factor for a reduced risk of obesity among breast-fed babies later in life. Another 'critical period' may be the adiposity rebound around age five. Children who have an earlier adiposity rebound tend to be fatter later, however, this period may also be associated with the establishment of dietary habits.

Social, environmental and economic determinants of adult obesity include work patterns, transportation, food production and food sales. Together, these external factors create an 'obesogenic environment' – where individuals operate in a society where opportunities for caloric intake are maximised and caloric expenditure is minimised. These environmental factors affect parents and consequently, children.

Behavioural determinants of childhood obesity are heavily moderated on parental choice. Parental overweight is itself strongly associated with childhood obesity. Factors affecting parent's decisions about what their children eat, how much, and

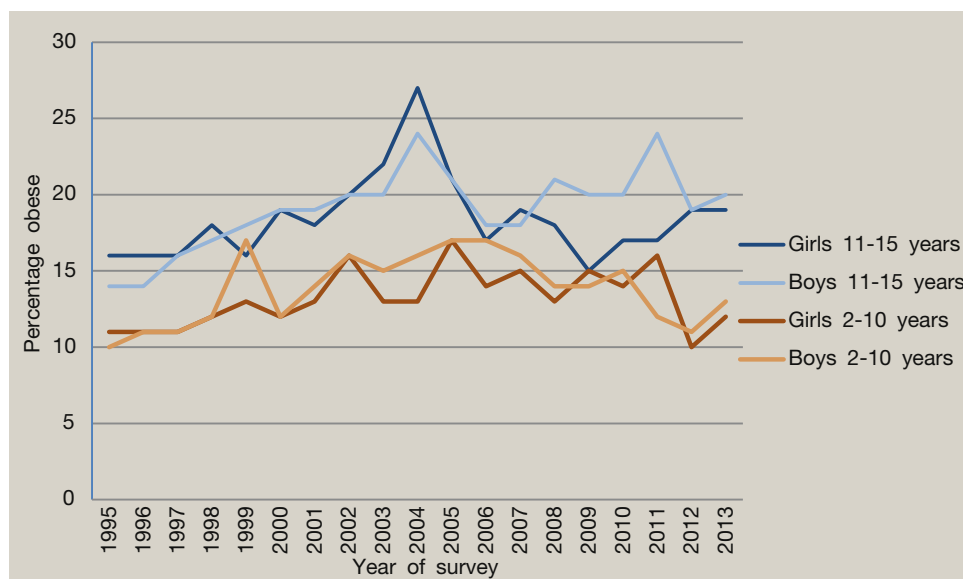


Figure 1 Childhood obesity from 1995 to 2013, as collected from the Health Survey for England.

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