Editorial

Childhood obesity: risk factors, prevention and management

An overwhelming body of evidence demonstrates that the prevalence of obesity has increased over recent decades, with the World Health Organization regarding childhood obesity as one of the most serious global public health challenges for the 21st century. Global estimates suggest that 155 million children (1 in 10) are overweight and 30–45 million are obese. While in developed countries strategies developed to monitor and manage overweight appear to have attenuated the rate of increase, economic prosperity and transformation of diet and lifestyle for families in developing countries has driven an increase in prevalence globally and numbers of overweight and obese children now exceed the numbers of children who are underweight and malnourished. Wang & Lobstein (2006) reported that between 1980 and 2005, the prevalence of obesity in school-age children had increased in almost all countries for which data were available. China, in particular, has seen a dramatic increase in prevalence of obesity, and Zhang & Wang (2013) reported substantial increases in fat mass among 7- to 18-year-old Chinese reflecting this trend over 1995–2010. Where nations undergo an economic and nutritional transition, the associated rise in overweight and obesity is often seen alongside malnutrition as the disparities between rich and poor become more pronounced. While poverty associates with malnutrition and infectious disease, relative wealth and a more leisure-based lifestyle promote overweight and the long-term consequences. This places a double burden upon health services, which have to manage the consequences of both ends of the nutritional spectrum (Manios *et al.* 2013).

The drivers of obesity in childhood are, just as in adults, a product of the interaction between genotype, dietary habits and levels of physical activity. No single factor can be identified as the primary cause, and for any individual the balance of energy intake and expenditure will depend upon family circumstances (poverty, housing, education, food security, transport, leisure activity, balance of sedentary/active occupations). There is increasing interest in the contribution that the nutritional environment during fetal devel-

opment and the first 2 years of life may make to determining risk of childhood obesity (Langley-Evans 2014). The relationship between prenatal nutrition and later obesity is complex, and while there is evidence that babies born to overweight mothers are at risk of obesity (possibly genetic or otherwise familial) (Oken *et al.* 2009), it is also apparent that maternal undernutrition in pregnancy leading to low weight at birth is a risk factor for overweight in children (Yang & Huffman 2013). The infant diet is also important and a body of evidence gives cautious support for the idea that breastfeeding and delaying the introduction of complementary foods until beyond 4 months of age may protect against overweight during childhood (Arenz *et al.* 2004; Moorcroft *et al.* 2011). Early feeding practices, particularly formula feeding, may establish the neuroendocrine control of food intake, essentially conditioning some children to over-consume later in life (Bonuck *et al.* 2014).

The consequences of obesity for the immediate health of children are currently ill defined, but a growing literature suggests an earlier onset of type 2 diabetes and increased risk factors for cardiovascular disease (Daniels *et al.* 2005). The greatest concern is that obesity appears to 'track' from adolescence to adulthood (Wright *et al.* 2001), and so early intervention to prevent and manage obesity in younger children is therefore considered to be a high public health nutrition priority. The successful initiation of interventions to target overweight may be hampered by the fact that parents do not engage as they fail to perceive their children as overweight or at risk (Rietmeijer-Mentink *et al.* 2013). Health professionals often struggle to broach the subject of overweight with parents (Redsell *et al.* 2013) creating a further barrier to successful intervention.

The successful delivery of strategies to prevent obesity is largely dependent upon strong partnerships between parents, nursery care, schools and health professionals. Willis *et al.* (2012) reported that training of community workers to work with parents in delivering the Health Exercise Nutrition for the Really Young programme through Sure Start Centres

had a number of benefits including the provision of age-appropriate portion sizes and increased staff confidence around tackling lifestyle change and working with families. Schools provide numerous opportunities for prevention, as it is possible to provide access to healthy meals and snacks (Madden *et al.* 2013), exercise (McFarlin *et al.* 2013), health education and more personalised interventions. Elizondo-Montemayor *et al.* (2013) reported that providing an individualised structured daily meal and a physical activity plan, tailored for 6- to 12-year-old overweight and obese, brought about lifestyle change and reductions in body fat, blood pressure and adverse metabolic indicators. Active engagement of parents with weight management is essential, as prevention of obesity in childhood requires families to make wholesale lifestyle changes. Where parental obesity is not addressed, the likelihood of child-focused interventions succeeding is low (Fassihi *et al.* 2012).

This joint virtual issue brings together a collection of key articles that describe critical contemporary issues related to childhood obesity. These articles recognise that childhood obesity is the result of multiple factors and that the dietary and physical activity behaviours of children are influenced by many sectors of society, including families, communities, schools, child care settings, medical care providers, government agencies, the media, and the food and beverage industries and entertainment industries. It is clear that broader public health strategies are needed, with government agencies and organisations working together more effectively, in partnership, to halt the escalation in childhood obesity. The papers published in this virtual issue act as a useful resource in achieving this aim for policy makers, health professionals, and those who work with children and young people.

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