



Obesity in Young Children: What Can We Do About?

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Introduction

Obesity in young children

Childhood obesity is a serious public health challenge. In 2010, 43 million preschool-aged children worldwide were overweight or obese with a prevalence of 6.7% [1]. The rising trends in overweight and obesity are apparent in both developed and developing countries [2]. Many studies of overweight and obesity among young children have been conducted internationally. For example, a study from the USA found 11.3% of children aged between 2 and 5 years to be overweight (defined as >95th percentile for weight for height) [3]. In 2007 a study from the Australian National Children's Nutrition and Physical Activity Survey found about one in five children aged 2-3 years were overweight or obese [4]. The prevalence of overweight and obesity in young Italian children (2 to 6 years old) was 16.6% [5]. A Kuwaiti study reported that 18.4% of girls and 16.1% of boys between 6 and 59 months were obese (defined as >2 SDs above the median value for the reference weight for height) [6]. In a study undertaken across eight provinces in China the prevalence of overweight and obesity (defined using the International Obesity TaskForce criteria) among children aged 2-6 years was 28.9% and 6.4% respectively [7].

The need for early intervention

The importance of early intervention in the first few years to prevent the onset of obesity has become clear, with accumulating evidence that excess weight and fast weight gain in early childhood are related to overweight later in life. A recent review of body size and growth in 0-4 year-old children and the association with body size at age 5-13 years supported conclusions in previous studies of a positive association of body size and weight gain in early childhood with subsequent body size [8]. In particular, body size at 5-6 months of age and later and weight gain at 0-2 years of age were consistently positively associated with large subsequent body size. Another review of early growth patterns and later body size has similarly found the positive association between them [9]. However, the reviews were potentially limited by being mainly based on studies from developed Western countries and caution needs to be taken in terms of inferring causality.

Other adverse health consequences of excess weight early in life are also well documented. A study using longitudinal data found rapid weight gain in the first 3 months of life was associated with several determinants of cardiovascular disease and type 2 diabetes in early adulthood [10]. It has been argued that efforts to prevent childhood obesity should begin in the early years, and even before birth [11].

Main modifiable behaviour factors in the early years of life

While underlying genetic factors, poverty and low educational status may predispose to overweight and obesity, the basic cause is energy imbalance – excessive energy intake in relation to inadequate energy expenditure [12] though numerous other factors contribute to its development. There is increasing epidemiological evidence linking early nutrition and physical inactivity with the development of obesity in children.

Infant feeding practices, including breastfeeding and the timing of the introduction of solids, as well as children's eating habits and

television (TV) viewing time are among the most identifiable factors contributing to early onset of childhood obesity. Two systematic reviews on infant breastfeeding and childhood overweight/obesity conclude that breastfeeding is protective against overweight/obesity, with some studies showing a dose response [13,14]. Early introduction of solids and consumption of energy dense foods are associated with higher rates of obesity [15]. A strong, positive association has been found between the consumption of sugar-sweetened drinks and obesity in different cohorts of older children [16]. Children's television (TV) viewing time is also among the most identifiable factors contributing to early onset of childhood obesity [17].

Based on current evidence improving infant feeding practices should be the main focus of the early intervention. Infant feeding practices constitute an important aspect of early child growth. The World Health Organization (WHO) recommends that parents breastfeed exclusively for the first six months of life and continue breastfeeding for up to two years or beyond, and wait until the second half of the first year to introduce solid foods [18]. The recommendations have been adopted and endorsed by many countries, including Australia [19].

Evidence of early childhood obesity interventions

Numerous studies have investigated interventions for preventing childhood obesity, but the results of many remain inconclusive due to lack of long-term follow-up. Dietary education and modification, with increased physical activity and reduced sedentary behaviours, remain central to any intervention. It is widely agreed that multi-dimensional intervention approaches involving the family, school, community and government are required to prevent childhood obesity [20]. Ideally, these interventions should also commence very early in life, as there are significant associations between infant and childhood BMI, and the risk of progression to adult overweight and obesity. Early intervention is vital and prevention can result in substantial social and health gains for society and individuals.

Evidence from the healthy beginnings trial

To tackle the early onset of childhood obesity, the Healthy Beginnings Trial [21] was conducted in Sydney, Australia in 2007-12. The trial is one of few randomised controlled trials to test the effectiveness of an early childhood obesity intervention in the first two years. It is a staged, home-based early intervention designed to improve infant feeding practices, eating habits and active play, and reduce TV viewing time, as

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well as improve family behavioural risk factors for childhood obesity. The Healthy Beginnings Trial was undertaken in some of the most socially and economically disadvantaged areas of Sydney where there is a great need for social support. The key intervention messages used in the Healthy Beginnings trial included:

- Breast is best
- No solids for me until six months
- I eat a variety of fruit and vegetables every day
- Only water in my cup
- TV away let's go play
- I am part of an active family

The intervention involved home visits by an early childhood nurse, initially one antenatally, and then seven visits at 1, 3, 5, 9, 12, 18 and 24 months after birth. The positive results [22,23] included a significantly higher median duration of breastfeeding by 4 weeks at 12 months, a 12% reduction in the proportion of children having solids before 6 months, a 7% increase in the proportion of children having >1 serve a day of vegetables, and an 8% reduction in the proportion of children watching TV for >60 mins a day, as well as a reduction in BMI at 24 months.

The Healthy Beginnings Trial has combined the necessary features including “early”, “family” and “behavioural intervention”, to become an effective childhood obesity prevention program. With the potential to address such a significant health issue through a relatively simple intervention, it is hoped that the trial will influence future public health policy, and reduce the current burden of disease in Australia and elsewhere. However, an argument against home-based interventions could be “at what cost?” The effects of the intervention upon traditional service delivery models and its cost-effectiveness on a large scale are unknown and require further investigation. Currently there is no systematic model of home visiting published that focuses on preventing early onset of childhood overweight and obesity. Many other factors that are likely to contribute to early infant feeding practice, such as social, cultural, economic and environmental factors, have not been able to be fully addressed.

Potential new approaches

The high cost associated with home visits potentially limiting population reach, other low cost approaches with high uptake need to be explored. Advances in communication technologies have opened new possibilities for innovative health service delivery and public health interventions. Mobile health (or mHealth) refers to the use of mobile devices to improve adherence to health advice, increase access to health information, and to promote healthy behaviour. One of the growing applications of mHealth is smartphone app, whereby health promotion and relevant health information messages are sent directly to targeted recipients. The advantages of using smartphone app to support health promotion interventions include: relatively low cost; avoidance of travel to health facilities; flexible service program delivery; the delivery of messages quickly and simultaneously to a large number group of participants. Such approach is yet to be tested in the area of child obesity prevention. Currently, a smartphone App for as alternative means to deliver the staged early interventions to mothers of young children is being developed by the author and his team. Its effectiveness will be tested in future studies.

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