ENCYCLOPEDIA on Early Childhood Development

Obesity Prevention During Infancy: A Change of Focus

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Introduction

Over the course of human history, feeding practices for newborns and infants have focused on ensuring adequate caloric intake to support adequate growth. These parenting practices evolved due to the possibility that famine was a common risk, and have persisted despite the unlikely occurrence of food scarcity in most of the developed world. Healthcare providers also have focused on ensuring adequate newborn and infant growth, and more specifically avoiding insufficient growth during the neonatal period and infancy, consistently guarding against the possibility of the diagnosis of “failure to thrive.” This however is problematic given that today, in the developed world, food is plentiful, and it is easy to obtain inexpensive, palatable, high-calorie foods even for very young children. Failure to thrive due to too few calories is uncommon, but parenting practices such as encouraging infants to finish bottles, “topping a child off” with extra calories before bedtime, pressuring infants to eat large servings of solid foods, and using food to soothe non-hunger related infant distress have persisted[1] and can result in excessive weight gain during infancy. Healthcare providers also contribute to this problem from the first days of a baby’s life. While giving appropriate guidance to wake newborns every 3-4 hours to feed in the week following birth to prevent excessive neonatal weight loss, clinicians commonly neglect to

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inform parents to stop this practice once a baby returns to their birth weight and has established a healthy pattern of weight gain. Although most infants return to birth weight by age 2 weeks, a popular reference from the American Academy of Pediatrics recommends waking a baby that sleeps longer than 4-5 hours for a feeding during the first month.[2] Further, clinicians continue to guard against failure to thrive but despite increasing rates of obesity, are very unlikely to diagnose excessive weight gain or obesity during infancy.[3]

Subject

In recent decades the prevalence of obesity has increased dramatically among all age groups, including infants and young children.[4,5] Almost 10% of U.S. children less than 2 years are already obese and over 25% of children between ages 2 and 5 years are overweight.[5] Across the globe, similar trends exist.6 Both overweight and rapid growth during infancy have significant long-term consequences, and are associated with adult obesity and its co-morbidities including hypertension, coronary artery disease and *type 2 diabetes mellitus*.[7-10]

Problems

Because infancy is a critical period of developmental plasticity with long-lasting metabolic and behavioural consequences,[10,11] interventions developed for delivery during this period may alter long-term risk for obesity and associated co-morbidities. However, while modifiable factors promoting overweight and rapid growth during infancy have been identified,[12-14] preventive interventions addressing these factors are scant.[15] Further, both parents and healthcare providers must be educated to change their traditional focus from ensuring sufficient growth to recognizing and intervening upon early life obesity and its risk-factors.[16,17]

Research Context

Although it is a major public health problem with long-term consequences, parents and healthcare providers typically do not see early life obesity or rapid infant weight gain as problematic and instead often consider a chubby baby to be a healthy baby.[18]

Key Research Questions

Can the increasing prevalence of early life obesity be reversed?

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Given the complex biological, behavioural and socioeconomic factors that interact to result in childhood obesity, what time periods in development should be targeted on both individual and societal levels and what are the most effective intervention components?

1. What model is best for delivering obesity prevention interventions for infants (e.g., primary care-based, home visitation, other)?
2. Can early life metabolic and behavioural influences on obesity be permanently changed via early life interventions?
3. Is pregnancy or infancy the best time to intervene to prevent childhood obesity and its co-morbidities? Could interventions during both periods be synergistic?

Recent Research Results

Prior to 2010, there were no intervention studies demonstrating beneficial effects on weight status of children younger than 2 years.[19] Since then, two pilot studies showed positive effects on weight status of early intervention programs,[20] and other trials are in progress.[21-24] In one pilot, nurses assisted mothers in developing parenting skills related to three areas of infant behaviour believed to affect early obesity risk: sleeping, crying and feeding. First-time mothers who intended to breastfeed were randomly assigned to receive a soothe/sleep intervention, an introduction of solids intervention, both interventions, or no interventions. Interventions were delivered via home visits at ages 2-3 weeks and 4-6 months. One hundred and ten mother-infant pairs completed the one- year study. The soothe/sleep intervention focused on strategies to lengthen infant sleep and taught parents soothing strategies to use rather than indiscriminately feeding in response to infant fussing. At age 2-3 weeks, dyads randomized to this intervention were instructed on alternate soothing responses, including swaddling, side or stomach position, shushing, swinging, and (non-nutritive) sucking. Parents were also taught to emphasize day/night differences. The introduction of solids intervention focused on “when,” “how,” and “which” foods to introduce to infants and provided systematic experiences with new foods between ages 4-6 months. Infants receiving both interventions had significantly lower weight-for-length percentiles at 1 year compared to other groups. This result is depicted in Figure 1, where the y-axis depicts weight-for-length percentiles using the World Health Organization (WHO) growth charts.[25]

The second pilot study assessed a primary care based intervention to promote healthful behaviours among 0-6 month old infants and their mothers including motivational counseling and group parenting workshops.[26] Eighty infants completed the 6-month trial with fewer intervention infants being in the highest quartile of weight-for-length *z-score* at 6 months of age (22% vs.

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42%).

Research Gaps

While these pilot intervention results are promising, there are additional possible targets for the primary prevention of early life obesity[27] including improving dietary content, increasing physical activity, reducing sedentary behaviours, improving sleep hygiene, improving parental understanding of normal infant growth, and improving parental responsiveness to infant cues and infant distress. For most candidate interventions, however, there are insufficient data on their effectiveness or data to support their reproducibility in and generalizability to different setting, cultures, or populations. Further, there is no evidence that early life prevention of overweight or obesity will lead to long-term prevention of obesity or its co-morbidities.

Conclusions

With obesity rates climbing for infants and toddlers globally, interventions are needed for this age group, given the lifelong consequences of early life obesity. Despite the limited evidence to date supporting interventions for obesity prevention during infancy, there has been increasing interest in this topic because infancy is a time of exceptional metabolic and behavioural plasticity. While there are numerous opportunities for intervention, a culture change among parents and pediatric healthcare providers is needed in order to change the primary focus of weight status in infancy from prevention of failure to thrive to the prevention of over-thriving. Societal acknowledgement of this problem and a change in focus by clinicians and parents will be timely as solutions appear to be forthcoming. In the meantime, those interested in the complexity of this topic plus potential solutions can review the Institute of Medicine's recent publication, Early Childhood Obesity Prevention Policies, which focuses on the period from birth to age 5 and includes brief reviews of the evidence for some of these factors influencing early growth in infancy and early childhood.[18]

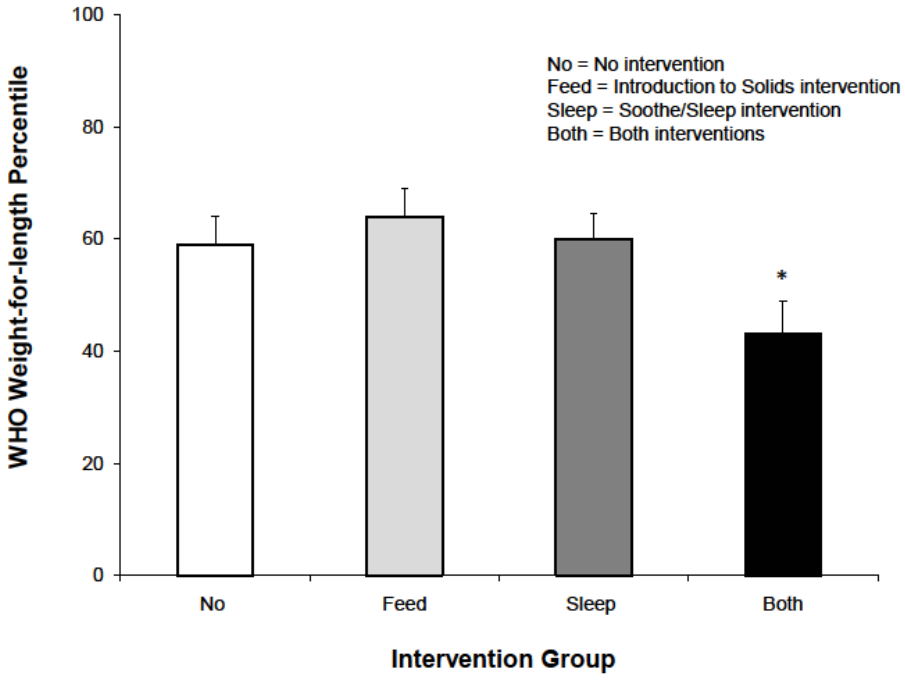
Implications for Parents, Services and Policy

In our current *obesogenic environment*, it has become easier for parents, healthcare providers, and policy makers to view being overweight as normal. Unfortunately, obesity and its co-morbidities may have devastating health effects for individuals and economic effects on a societal level. Failure to recognize overweight infants is common and its consequences can be dire. Fortunately, research into promising interventions is increasing, and policy makers are

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drawing attention to the problem. First Lady Michelle Obama's program, "Let's Move," aims to solve the childhood obesity epidemic within a generation and includes messages that begin during pregnancy and infancy, such as the promotion of breastfeeding as the preferred source for infant nutrition.[28] In addition, the recent Institute of Medicine report on Early Childhood Obesity Prevention Policies focuses on preventing obesity during infancy and early childhood.[18] Policy recommendations include promoting growth monitoring and early screening by healthcare professionals to identify infants and young children who may be at risk based on early growth. The report also includes policies designed to impact developing lifestyle behaviours associated with increased obesity risk, including sleep, eating patterns, physical activity and media exposure. The recommendations are based on current evidence and the evidence-based belief that changing policy can change obesity. The report also highlights the need for research to evaluate the impact of policy recommendations and to develop more effective early interventions. All of these programs and research demonstrate clearly that our society must shift its traditional primary focus from ensuring adequate growth to the preventing obesity.

Figure 1. Infants who received both interventions had lower weight-for-length percentiles at age 1 year (n=110), relative to the WHO growth standards. (Adapted from Paul et al. Preventing Obesity during Infancy: A Pilot Study. Obesity 2011; 19: 353-6120).



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