



Preventing Obesity in Children from Birth to Five Years

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Topic

Obesity

Introduction

The prevalence of pediatric overweight and obesity has steadily increased over the last few decades. For children between the ages of two and five, the National Health and Nutrition Examination Survey (NHANES) (1999 to 2000) reported the prevalence of obesity (body mass index (BMI) $\geq 95^{\text{th}}$ percentile) was 10.4%, while three decades ago it was 5.0%.¹ More disconcerting was the prevalence of obesity among low-income preschool children – 14.3%.² Including children at risk for obesity (BMI of 85th to 94th percentile), overall prevalence increased to 20%.³ Not only has the prevalence of obesity increased, but the distribution of BMI has also shifted toward the upper end.² These figures are troubling, since overweight preschoolers are more likely to become overweight adults.⁴

Subject

Pediatric obesity prevention has traditionally been implemented in school-aged youth^{5,6} and more recently in preschool children.⁷⁻⁹ And, although these interventions show promise, emerging research suggests that factors associated with obesity present much earlier. Recent research identifies infancy and the intrauterine environment as potential high-risk periods.¹⁰ Lucas¹¹ and Jackson et al¹² suggest that there exists a programming response established by the interaction of the infant with his or her early environment.¹³⁻¹⁵ During this sensitive period of early life, long-term changes in physiology and metabolism may take place, resulting in biochemical, metabolic and neurological disorders later in postnatal life.^{11,12,15-18} Impaired growth and development during fetal life and infancy are linked to obesity in both childhood and adult life.^{19,20} During early infancy, breastfeeding may have a protective effect.²¹

Problems

Problems that may lead to overweight in children from birth to five years include the following:

1. low birth weight and catch-up growth,²²
2. maternal smoking;^{23,24}
3. maternal diabetes;²⁵

4. maternal overweight prior to and during pregnancy^{26,27} (large for gestational age infants);^{14,28}
5. lack of breastfeeding.²¹

Research Context

During the prenatal, early infancy and preschool years, several factors play a role in increasing or decreasing a child's risk for overweight. Both low birth weight and rapid catch-up growth during infancy are strong predictors of obesity, hypertension, non-insulin-dependent diabetes and coronary heart disease.^{13,16,29} Maternal smoking during pregnancy is also associated with low birth weight, as well as an increased risk of overweight in children before the age of eight.^{23,24} Both intrauterine restraint of fetal growth and maternal smoking are associated with catch-up growth, which in turn relates significantly to both obesity and central fat distribution in children at five years of age.^{22,23} Maternal overweight is a major contributing factor to the most common medical complication of pregnancy, diabetes. Maternal overweight prior to and during pregnancy, as well as maternal pre-gestational and gestational diabetes, are associated with adverse birth outcomes, including low birth weight and large-for-gestational-age infants.²⁸ These rapid and inadequate rates of intrauterine and fetal growth increase the risk for overweight during childhood and adult life.^{19,20} Recent research has associated breastfeeding with providing a protective effect against overweight during childhood.^{21,30} Moreover, increased duration of breastfeeding is also associated with lower risks of overweight.^{31,32}

Key Research Questions

Most research identifies variables that have a persistent effect on overweight children from birth to five years, rather than prevention efforts, in this age group. Recently, however, the focus has shifted to prevention of overweight in children.⁷ The following studies concentrate on prevention of overweight in children by targeting mothers as well as preschool children.

Recent Research Results

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) includes interventions that target low-income, nutritionally at-risk infants, children, pregnant and postpartum women.² WIC provides supplemental foods, nutrition education and health-care referrals.² Participation in WIC is associated with improved birth outcomes, particularly among single high-school dropouts and teen mothers, as well as increases in initiating breastfeeding.^{33,34} Moreover, longer prenatal participation in WIC maintains this significant positive effect on birth weight.³⁵ Participation in WIC has been shown to promote a positive effect on preschoolers' diets as well.⁸

In a study by Harvey-Berino et al,³⁶ mothers of preschool Native-American children enrolled in a WIC program were recruited to participate in a home-visiting intervention for four months. The goal of the intervention was to provide additional parenting support in order to reduce the prevalence of obesity in preschool-aged offspring. The additional support focused on changing lifestyle behaviours, including obesity prevention, and

improving parenting skills. Children in the home-visiting program gained less weight over the four months than those not receiving the intervention.³⁶

Two programs, Healthy Start³⁷ and Hip Hop to Health, Jr.,³⁸ targeted children already enrolled in preschool Head Start programs. The goal of the Healthy Start program was to increase preschoolers' health awareness and knowledge. The curriculum integrated age-appropriate risk reduction activities to provide an opportunity to practice positive health behaviours. The lessons, which were held three times per week, taught healthy behaviours through stories, games, crafts, demonstrations and discussions.³⁷ The Hip Hop to Health Jr. program was also implemented in preschool Head Start programs. It was a randomized, controlled trial program that sought to reduce increases in BMI through dietary/physical activity intervention. Children received lessons regarding healthy habits, including nutritious eating as well as physical activity. Parents were also sent weekly newsletters that mirrored the children's curriculum. Both one- and two-year follow-up visits demonstrated success in significantly reducing increases in BMI as the children developed and matured.³⁸

Conclusions

Effective programs that target the prevention of early childhood overweight are needed for prenatal and postpartum women, and for preschool children.³⁹ Pregnancy and the postpartum period are times when women are more open to counselling about their own risks of overweight, as well as their child's risks.²⁸ Pregnant women should also be provided with help to cease smoking at the very minimum during pregnancy.²³ To prevent cases of maternal overweight and gestational diabetes, women should be encouraged to maintain a healthy weight, not only during pregnancy but also over their lifetimes.²⁸ Weight management programs to assist women of child-bearing age are needed. Because studies have shown an association between breastfeeding and decreased risk of overweight, programs that address the importance of breastfeeding are needed.³⁹ Weight states are shown to persist across time; therefore, it is crucial that pediatricians and primary care physicians actively participate in the diagnosis and prevention of childhood obesity.³ Very early monitoring of children's weight status is imperative. A child who reaches his or her second birthday at a healthy weight is less likely to become overweight at a later age. Thus, intensive preventive strategies should be employed before an unhealthy weight pattern becomes established.⁴⁰

Implications

Several obesity prevention measures should be adopted now to prevent even higher rates of obesity in future generations. Dietetic and exercise professionals should provide services that support appropriate weight gain before and during pregnancy, as well as in childhood. Policies that deter tobacco use and limit exposure to second-hand smoke for expectant mothers should be promoted. Hospitals and physicians' offices should establish educational courses for expectant mothers to promote initiation and duration of breastfeeding. Public-health professionals should also advocate for policies in communities, schools and worksites that support breastfeeding.²⁸ Health-care professionals should routinely provide families of preschool children with education and encouragement to eat healthy, nutrient-dense foods in appropriate portions and to provide

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safe environments inside and outside to promote active play.⁹ Both parents and policy-makers should advocate for child-care and school environments that support healthful eating and encourage physical activity throughout the toddler's day. As the child enters grade school, parents, school and community leaders should promote active transportation to and from school, recess time and high-quality physical education.¹⁹

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