

Early Prevention and Treatment Interventions for Childhood Obesity

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Abstract

Purpose of Review Childhood obesity is a challenge that pediatric providers face daily in the clinical setting. As a multifactorial chronic illness, obesity is complex, with numerous possible prevention, and treatment strategies. Clinical interventions in the primary care setting address factors such as promoting healthy behaviors from the beginning of life, increasing parental understanding of weight status and its relationship to health, dietary behaviors, screen time, and physical activity. These behaviors can be addressed through counseling and intervention tools, such as motivational interviewing. These interventions and tools can serve to strengthen clinical partnerships and unite practitioners and caregivers in successful obesity prevention and treatment.

Recent Findings Despite increased efforts in policy, as well as clinical and community-based interventions, there has been no dramatic decrease in pediatric obesity, and the nation has actually seen increases in severe obesity. Pediatric providers are learning that many clinical interventions may be starting too late. Recent research shows a relationship between bottle size and early weight gain, significant screen time exposure beginning earlier in infancy than recommended, and relationships between early sleep and obesity, prompting the need for early counseling on these issues. There are some new findings about

novel strategies, like incorporating the new principles of digital health, as well as the application of established tool of motivational interviewing applied to families with infants or young children.

Summary Helping parents adopt behaviors in diet and physical activity is a challenge for pediatric health care providers. Pediatric health care providers' use of tailored and easy-to-understand toolkits, motivational interviewing, culturally sensitive and patient-centered approaches, technology-enhanced care, and earlier interventions can be effective for the long-term success of obesity prevention and treatment in, and out of, the clinical setting.

Keywords Overweight · Obesity · Prevention · BMI · Media · Sleep

Abbreviations

BMI Body mass index
SES Socioeconomic status

Introduction

Despite increased efforts in clinical and community interventions, pediatric obesity and severe obesity remain prevalent, with 16% of children and adolescents with overweight [1•, 2] and another 17% with obesity [1••]. Vulnerable populations are at a much higher risk for obesity and severe obesity. Also concerning are the prevalence of younger children with overweight and obesity [3] and the rise of those with severe obesity [1••, 4••]. The effects of childhood obesity persist into adolescence and adulthood, with children affected by obesity having a higher risk for depression [5], emotional and behavioral disorders [5, 6], and cardio-metabolic risks [4••, 7].

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The Primary Care Setting

The primary care setting is unique in that it provides regular, repeated contact between the pediatrician and families. Parents trust their pediatricians and look to pediatricians to counsel on feeding, physical activity, and healthy behaviors. Providers must explore novel ways to maximize caregiver exposure to appropriate counseling in limited time [8].

The early origins of obesity-related behaviors provide an opportunity to intervene early in a child's life. This is particularly important because the first year of life is when primary care providers see children, and thus parents, most frequently. These studies show that for both prevention and treatment, pediatricians and pediatric health care providers should address obesity prevention early. As the child grows, this should occur by not only motivating dietary or physical activity changes for the child, but also by educating caregivers, since counseling is more effective if it targets both the parent and the child.

Early Feeding

There has been much research and controversy surrounding the topic of early feeding and its association with later obesity in children and adolescents, with some studies finding associations and some not. One early study found a reduced risk of overweight for “ever breast fed” compared to “never breast fed” children [9]. Another study, using data from a nationally representative sample, found that low socioeconomic children, who are already at a greater risk of obesity, who were formula-fed for their first 6 months of life were around 2.5 times more likely to have obesity at 24 months of age [10]. However, a large RCT that followed more than 13,000 children for 6.5 years found no association between prolonged or exclusive breastfeeding and obesity [11]. While the effects of breastfeeding are controversial, its potential as a protective factor, suggest pediatricians can begin obesity prevention by counseling mothers on exclusively breastfeeding their young infants.

For those choosing to formula feed infants, recent studies show that the larger the bottle, the more formula the infant will take, and the heavier the infant will be at 6 months [12, 13]. Primary care provider counseling on physical activity and diet, delivered to mothers with infants aged 2–10 months slows the increase in infant BMI *z* scores up until 4 years of age [14]. Early introduction and intake of fruit juices and other sugar-sweetened beverages in toddlers and children results in an increased risk for higher BMI *z* scores, overweight and obesity, and its comorbidities [15, 16, 17, 18, 19, 20, 21]. In May 2017, the American Academy of Pediatrics changed recommendations on juice intake in infants, recommending no juice for infants under 1 year of age. [22].

Screen Time

Exposure to screen time (now defined to include televisions, computers, video games, tablets, and cell phones) and unhealthy food and beverage advertisements is associated with increased weight in childhood and adolescence. [23–25]. The complex relationship between media consumption and weight is found partly in the sedentary nature of increased screen time, leading to limited physical activity time and increased calorie consumption [26, 27]. Branded product placement and obesogenic messages in media also have an influence in children's snacking preferences [28].

Recent data have shown that weight-related behaviors begin very early in life. Infants as young as 2 months old are exposed to an average of 346 min of television each day [29]. The AAP has released new guidelines in November 2016 stating that children aged 2–5 years should have limited screen time of up to 1 h of high-quality programming per day [30]. Pediatricians should continue to counsel caregivers at early primary care visits on keeping televisions and screens out of children's rooms as well as limiting non-educational screen time.

Sleep

Chronic sleep deprivation has grown in parallel to obesity from infancy to adulthood. Several [31], but not all [32], studies have shown correlations between sleep deprivation and increased overweight and obesity. One study looking at 16-month-old children showed a linear association between shorter nighttime sleep and higher energy intake, with children sleeping less than 10 h a night consuming more than 50 kcal per day than children sleeping 11–12 h a night [33]. A separate study exploring the link between chronic sleep curtailment and adiposity following children yearly from 6 months of age to 7 years old found that children with curtailed sleep at 6 months had higher BMI *z* scores and central adiposity at 7 years [34]. The results from this study also showed that minority infants (Black, non-Hispanic, and Hispanic) and infants from low SES households, who we already know to be at increased risk for overweight and obesity, were also at a higher risk for sleep curtailment, and therefore, increased overall adiposity in childhood [34].

Technology

Digital health, which includes technologies such as smartphones and wearable devices, is an emerging field to connect the clinical and community environments [35]. Interventions using eHealth are associated with decreased sugar-sweetened beverage and media consumption in at-risk adolescent boys providing groundwork for interventions using wearable technology, mobile devices, and technology

in younger children [36]. Despite their promise, such technology-based interventions do not yet have adequate evidence or the widespread availability for use in most pediatric clinical settings—particularly in the early childhood setting.

Motivational Interviewing

Motivational interviewing includes the integration of specific linguistic patterns and conversational techniques such as reflective listening, using open-ended questions, change talk, and shared decision-making and agenda setting with the patient and patient's family [37]. MI includes the strategic balance between health care providers' direct advice giving and nurturing of patient-initiated desires for change [37]. As a result of a large trial implemented in primary care pediatric offices, researchers found that primary care providers that were trained in motivational interviewing in the primary care clinical setting showed statistically significant and clinically meaningful reductions in BMI percentiles [37]. One recent example of MI being used in early childhood found that nurses who provided an MI intervention and used a specially designed motivational flowchart to speak with mothers who were currently breastfeeding infants at 2-month, 4-month, and 6-month immunization visits resulted in higher rates of continued breastfeeding at the 4-month visit [38].

Other Important Considerations in Primary Care Clinical Interventions

Clinical Setting

Health care providers have limited face-to-face counseling time, despite repeated contact. The US Preventive Services Task Force has found that effective weight management programs provide a minimum of 26 h of contact time with the child and/or family in a 6-month time period [39]. Unfortunately, such extensive contact (reflecting approximately 1 h per week) is unrealistic in the primary care setting. Successful implementation in primary care will require creative partnerships with the entire health care team, with specialty clinics, community organizations, and other recreation and educational facilities.

Weight Measurement and Perception

Body mass index (BMI) is most frequently used as the metric of success for obesity interventions. Several primary care interventions have documented modest reductions in child BMI [40–42]. However, patients and parents poorly understand BMI. A recent study found that parents of infants as young as 2 months old struggled to have an accurate perception of their infant in the first year of life, especially if their infant was

overweight [43]. Educational materials such as color-coded BMI charts, can improve understanding of BMI, particularly among those with lower numeracy skills [44, 45].

Underserved Populations

Underserved minorities—specifically, African American and Hispanic youth, and populations with a low socioeconomic status—have a much higher risk of obesity [2]. Screening for literacy, numeracy, and food insecurity is an important component of ensuring proper counseling. In an extremely diverse, low-income, low-literacy sample, caregivers have shown inaccurate perceptions of child weight in the first year of life creating concern for parental awareness of overweight or obesity in their children [43]. This unique sample, coming from the Greenlight Study, among many other important findings, highlights the importance of validating and providing culturally sensitive materials to rapidly diversifying populations [29, 46, 47]. Future work should aim to help serve other underserved minorities in the pediatric clinical setting.

Stigma and Weight Bias

One emerging concern is the negative portrayal of obesity and overweight in media directed towards children. Exposure to and normalization of weight stigma may result in increased teasing of children suffering from overweight or obesity [6]. Teasing from peers may exacerbate obesity-related behaviors. Perceived pressure to lose weight from adults, including health care providers, is associated with the use of unhealthy behaviors in order to control weight [43, 48]. Primary care providers have an opportunity to reinforce positive messages related to body size, and ensure they provide guidance for healthy behaviors rather than criticizing unhealthy ones, when discussing obesity with children and families. Although there is limited evidence of direct effects of bias in early childhood, positive messages should be consistent and begin in early ages.

Conclusion

Pediatric health care providers should begin clinical interventions to prevent obesity at an early age. Practices can tailor materials and counseling to vulnerable populations, including those with low SES, and low literacy/numeracy, to maximize pediatrician's time with parents and children. By focusing on obesity prevention and interventions earlier in childhood, prioritizing clinic time between pediatricians and caregivers, and improving obesity prevention strategies outside the office, we may begin to see a change in the pattern of early childhood obesity. Further research is needed to determine best approaches to treating early-onset obesity particularly in low

income and minority communities [49]. With regular counseling at each visit to the primary care clinical setting, the goal for practitioners should be focused on helping with the development of lifelong healthy habits with respect to nutrition, physical activity, and other lifestyle patterns.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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