

Management and Primary Prevention of Obesity and the Role of the Pediatrician: Systematic Theoretical Review

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Abstract

This study aimed at exploring the role of the pediatrician in the management processes for the prevention of obesity in a systematic theoretical review. Obesity prevention, in addition to treatment, is an important public health priority. This clinical report describes the rationale for pediatricians to be an integral part of the obesity-prevention effort. Research on obesity prevention in the pediatric care setting as well as evidence-informed practical approaches and targets for prevention are reviewed. Pediatricians should use a longitudinal, developmentally appropriate life-course approach to help identify children early on the path to obesity and base prevention efforts on family dynamics and reduction in high-risk dietary and activity behaviors. They should promote a diet free of sugar-sweetened beverages, of fewer foods with high caloric density, and of increased intake of fruits and vegetables. It is also important to promote a lifestyle with reduced sedentary behavior and with 60 minutes of daily moderate to vigorous physical activity. Therefore, This research also focuses on clinical practice. However, the role that a pediatrician can play in the community is also critical. And this research also identifies important gaps in evidence that need to be filled by future research.

1.1 Introduction

Because of the numerous medical and psychosocial complications of childhood obesity and the burden of pediatric obesity on current and future health care costs, this condition is now recognized as a public health priority by many groups and experts (Daniels, 2006).

Although treatment of obesity in the pediatric age group, as well as secondary and tertiary prevention, will remain a key component of a comprehensive strategy to address this public health problem, the results of treatment remain modest, and primary prevention is recognized as a critical part of a sustainable solution (Reeves Postolache & Snitker, 2008).

It is also increasingly recognized that both clinical interventions and supportive institutional and community environments are required to adopt more healthful lifestyles for the prevention of obesity and other non-communicable diseases (Kumanyika & Brownson, 2007).

For example, a comprehensive review of strategies for obesity prevention in the United Kingdom concluded that “the deceptively simple issue of encouraging physical activity and modifying dietary habits, in reality, raises complex social and economic questions about the need to reshape public policy in food production, food manufacturing, healthcare, retail, education, culture and trade (Kopelman, Jebb & Butland, 2007).

A healthy weight is defined by a body composition that positively contributes to an individual’s overall health, wellbeing and quality of life over their lifespan. Healthy weights in children vary by age, sex and height. It is also important to remember that weight is only one marker of health and a healthy weight is different for each individual child.

Body Mass Index (BMI) and Body Mass Index charts (*see figure 1*) can be used to assess whether a child is overweight or obese. BMI is an indirect indicator of body fat but will be less helpful if the individual measured is very muscular. The BMI is based on height and weight that tells if a child or adult is in a healthy range compared to his or her peers. The Canadian Medical Association recommends that physicians calculate BMI in children 2 years and up.

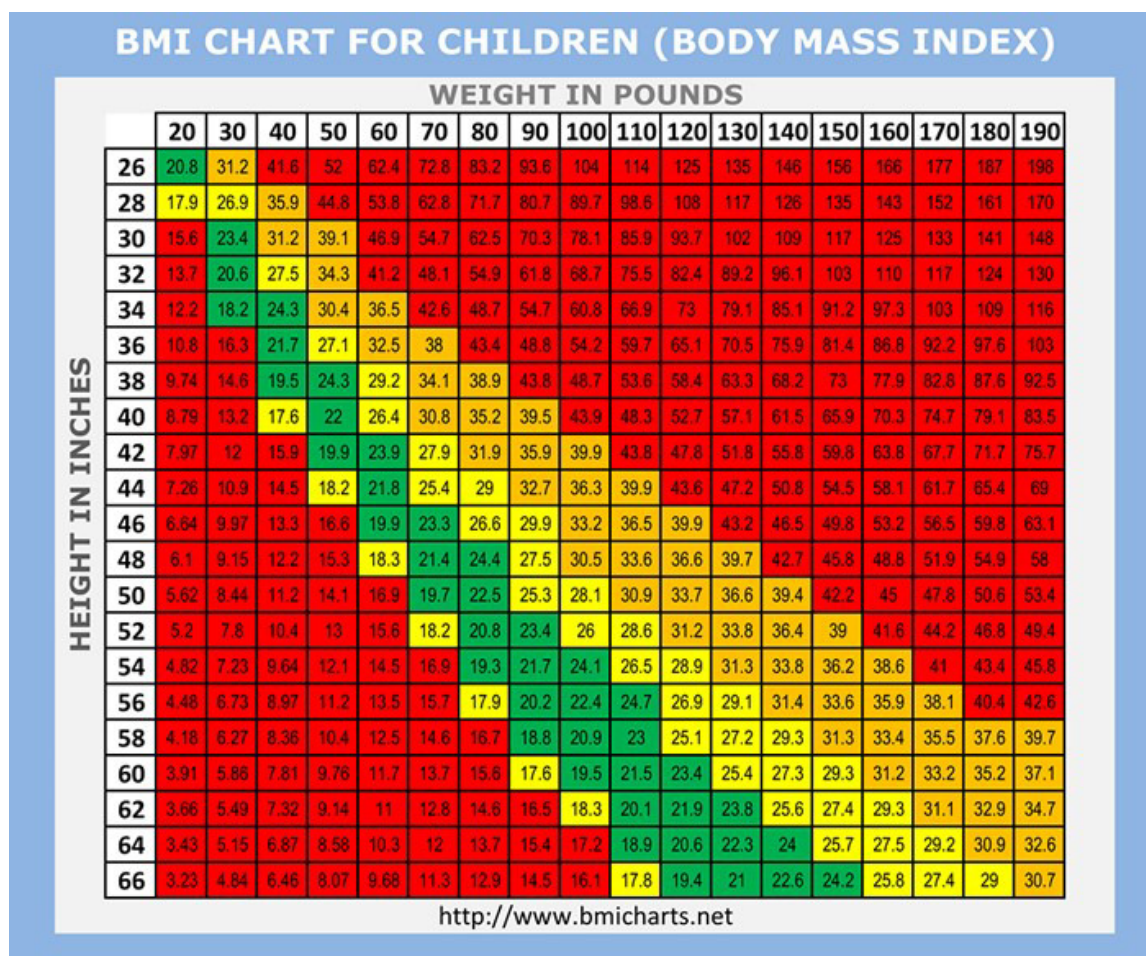


Figure (1): Body Mass Index chart for children

A growth chart is used to correctly interpret a child’s BMI. After calculating a child’s BMI, the next step is to plot the child’s BMI on a growth chart. The Childhood Obesity Foundation recommends using the World Health Organization (WHO) Growth Charts adapted worldwide. There are growth charts for boys and girls 2-19 years (WHO, 2017).

Pediatricians can and should play an important role in obesity prevention because they are in a unique position to partner with families and patients and to influence key components of the broader strategy of developing community support. Prevention of obesity is clearly not only the responsibility of pediatricians but of all elements of society, including the public and the private sectors (Allison, Downey, Atkinson, Billington, Bray, Eckel & Tremblay, 2008).

Unlike most schools, community-based organizations, or governmental programs, pediatricians often follow children over a long period of time, sometimes from fetal life through college, giving them a unique long-term perspective in preventing chronic conditions such as obesity. Furthermore, pediatricians, in the context of the medical home, have a family-centered perspective and are seen by families as a reliable source of health advice and as experts in developmentally appropriate approaches to prevention. This clinical report reviews the role of the pediatrician in practice and in the community as a behavior-change agent and advocate for healthful lifestyles for the prevention of childhood obesity (Rennie, Johnson & Jebb, 2005).

It is not a systematic review of evidence but rather an assessment of the best-available evidence that weighs the potential benefits of possible interventions.

1.2 Problem Statement

The adoption of healthful lifestyles by individuals and families can result in abstract a reduction in many chronic diseases and conditions of which obesity is the most prevalent (Daniels & Hassink, 2015).

Obesity prevention, in addition to treatment, is an important public health priority. This clinical report describes the rationale for pediatricians to be an integral part of the obesity-prevention effort. Research on obesity prevention in the pediatric care setting as well as evidence-informed practical approaches and targets for prevention are reviewed. Pediatricians should use a longitudinal, developmentally appropriate life-course approach to help identify children early on the path to obesity and base prevention efforts on family dynamics

and reduction in high-risk dietary and activity behaviors. They should promote a diet free of sugar-sweetened beverages, of fewer foods with high caloric density, and of increased intake of fruits and vegetables. It is also important to promote a lifestyle with reduced sedentary behavior and with 60 minutes of daily moderate to vigorous physical activity.

Therefore, This research also focuses on clinical practice. However, the role that a pediatrician can play in the community is also critical. And this research also identifies important gaps in evidence that need to be filled by future research.

1.3 Clinical Approaches to Obesity Prevention

The prevention of childhood obesity has been the subject of many research studies, reviews, and guidelines, primarily in the school or community setting, and these studies were taken into consideration for this report (Gahagan & Silverstein, 2003).

However, little is known about the feasibility, effectiveness, and cost of childhood obesity prevention in the primary care setting. Because research on pediatric obesity treatment began earlier than the research on pediatric obesity prevention, and because more data are available on treatment, many of the tools and behavior targets used for prevention derive from our knowledge of treatment. Because the motivation for prevention differs from that for treatment, and because an individual with obesity frequently differs metabolically from a person of healthy weight, this approach may have limitations that further increase the challenges of obesity prevention in a clinical setting designed for treatment. Despite these limitations, obesity-prevention strategies in the pediatric clinical setting can be informed by findings about obesity treatment, obesity prevention in other settings, and obesity prevention among adults.

Several studies have examined the efficacy of obesity prevention in pediatric primary care settings. Patrick et al²⁶ used a randomized controlled design to compare a control intervention unrelated to obesity to a 12-month, theory-based intervention aimed at reducing sedentary behavior, promoting physical activity, and promoting healthier nutrition. The intervention was initiated in primary care but, after the initial primary care visit, was delivered by research staff by phone and mail. The intervention improved self-reported sedentary behavior, improved fruit and vegetable intake, and increased objectively measured physical activity among boys only. In a pilot study that used a natural experiment design, Kubik et al showed that another practice-based intervention successfully increased parental intent to give their children 5 or more servings of fruits and vegetables per day. In a 6-month nonrandomized feasibility study, Schwartz et al used primary care-based motivational interviewing to improve eating and sedentary behaviors. The intervention was found to be feasible; parents reported that it helped them change family eating habits, but no significant effect on BMI was observed. Furthermore, the drop-out rate was much higher in the more intensive intervention than in the minimal intervention or the control group. Ford et al showed in a randomized controlled pilot and feasibility trial that a primary care-based behavioral intervention was successful not only at decreasing television watching but also at increasing organized physical activity.

1.4 Strategies To Implement Prevention

Most of the approaches and targets described in this section are derived from research on obesity prevention in other settings and age groups, on obesity treatment, or on the prevention of other conditions in pediatric and other primary care settings. They represent the best-available evidence informing clinical practice.

Regardless of the strategy used for prevention, it cannot be overemphasized that prevention should be tailored to the child's developmental stage, as well as to family characteristics (Kumanyika, 2008).

Because pediatric primary care providers follow children longitudinally, they often know families for a long time and are aware of the families' characteristics that are relevant to the tailoring of prevention interventions. They are also well positioned to deliver developmentally appropriate preventive interventions.

Pediatric practitioners should be familiar with the specifics of the racial/ethnic, cultural, and socioeconomic groups to which their patients belong. Getting involved with the community and studying the characteristics, strengths, and challenges different cultural groups face will help develop greater cultural competence and improve tailoring of prevention interventions for patients and their families.

1.4.1 Identification of Children at Risk

To prevent obesity, pediatricians should identify children at risk of developing obesity.⁴⁰From birth through 23 months of age, weight-for-age and weight-for-length should be monitored by using the new World Health Organization normative growth charts based on healthy breastfed infants.

For children aged 2 years and older, BMI changes should be monitored by calculating and plotting BMI on the Centers for Disease Control and Prevention growth charts at every health care visit so that obesity-prevention interventions can be implemented when a child starts to cross BMI percentiles upward, even before they approach the 85th or the 95th percentile. A study found that only 46% of pediatricians surveyed routinely calculated and plotted BMI. However, more recent evidence shows substantial improvement among pediatricians

in primary care practice (Perrin, Skinner & Steiner, 2012).

Prenatal risk factors for obesity include parental obesity, maternal gestational diabetes, and maternal smoking during pregnancy. Child risk factors include never being breastfed, rapid infant weight gain, short sleep duration, depression, and having a disability.

1.4.2 The Role of Education

Although most of the population recognizes the benefit of healthy nutrition, physical activity, and reduced sedentary behavior, few follow public health recommendations, which suggests that more education is unlikely to result in significant improvement for most people. Most obesity-treatment studies use education as the control or placebo intervention, assuming that education alone will have little or no effect on obesity-related behaviors. However, education and counseling may have important roles in primary prevention, especially if pediatricians provide information in the context of the child's growth and health and the family's health history. Reiteration of core messages from early in life may foster parenting that promotes a healthy lifestyle and strengthens prevention. The pediatrician's advocacy within the community for environmental supports of healthful behaviors can be an important adjunct to education.

A few simple screening questions about breastfeeding knowledge, healthy food choices, appropriate portion sizes, food label reading, nutrients of concern, energy balance, the benefit of physical activity, and the negative effect of sedentary entertainment can identify appropriate targets for counseling. Health education, including use of handouts, can address these gaps.

1.4.3 Managing the Food and Activity Environment

After an assessment of the current food environment has been performed, the family should be encouraged to buy fewer of the foods that are associated with the development of obesity, such as sweetened beverages (including fruit-flavored drinks), high-caloric-density snacks, or sweets. If these items are present in the house for special occasions or other purposes, they should be purchased immediately before the event and removed immediately afterward to decrease the temptation to snack on these items. In contrast, healthy alternatives, such as water pitchers, fruits, vegetable snacks, and other low-calorie snacks should be readily available at all times and placed in plain sight; for example, in front of the refrigerator or in large bowls on the kitchen counter or table. Practically, the cookie jar should be replaced by a fruit bowl. If high-calorie foods remain in the home, they should be packaged in foil to make them less visible and more forgettable. Healthier, low-calorie items should be placed in front of the refrigerator and pantry, and high-calorie items should be placed in the back. Such environmental manipulations help children and adolescents make healthier choices, because visible and easily available foods are more likely to be chosen than are foods that require an effort to find.

Larger serving sizes increase intake, because they influence consumption norms and decrease the accuracy of consumption monitoring. Therefore, pediatricians should recommend to families that they decrease the size of the main dish, serving dishes, serving spoons, plates, bowls, and glasses for calorie-dense foods and increase these for lower-calorie foods. Parents should also be warned that many prepackaged food items and portion sizes at most restaurants contain more than 1 serving size and that these are often not appropriate for children.

Eating directly from the package should be discouraged, and high-calorie snacks should be repackaged at home in smaller containers. It may also be helpful to recommend healthy snacks that are prepackaged in a size that is an age-appropriate portion size. In addition to convenience and decreasing caloric intake, this approach may help families learn the size of an age-appropriate serving.

1.5 Food and Activity Targets for Prevention

A number of potential food and activity targets for prevention have been described. Most of these have not been widely investigated. Targets that have been implemented in other settings, age groups, or for treatment are highlighted in this section. Some of these targets have combined benefits, such as the associations of decreased intake of sweetened beverages with dental health benefits, or the effect of increased sleep duration with improved learning. Therefore, promoting a healthy lifestyle and obesity prevention can be integrated into other aspects of prevention. Furthermore, these benefits may be more relevant as motivators to families who do not yet perceive the risk of obesity as important.

1.5.1 Beverages

1.5.1.1 Sugar-Sweetened Beverages

There is indirect or preliminary evidence that intake of sugar-sweetened beverages may lead to excess weight gain in children. There is also evidence that these beverages are associated with tooth decay.⁷⁶ Because there is no evidence for health benefits of sugar-sweetened beverages, health-promotion efforts in pediatric practice should aim at removing all sugar-sweetened beverages from children's diets. Although many beverages are easily identified as sugar-sweetened beverages (soda, ice teas), some families may need education on other sugar-sweetened beverages that are less easily identified (sports drinks, energy drinks, and juice drinks).

1.5.1.2 Water

The ideal beverages for children at all meals and during the day are low-fat milk and plain tap water. In the

unusual situation in which tap water is unsafe, filtered or bottled water should be considered. Sparkling water and unsweetened flavored waters can be considered in transitioning from sodas to plain water. Low-fat or fat-free milk (preferably unflavored milk) also has an important place in children's diets, because milk contains important nutrients that are often deficient in the diets of children. There is no evidence of benefit from vitamin or protein waters, because the nutrients contained in these products are not typically deficient in children's diets. Replacing sweetened beverages with tap water should also be presented to families as a cost-saving change. Costs may be particularly motivating to low-income families who struggle to provide a healthy, balanced, and inexpensive diet to children. For higher-income families, savings from this change could be set aside for fun, family-based activities.

1.5.1.3 Juice

Another alternative is to consider providing small amounts of "naturally" flavored drinks without added sweeteners, such as 100% fruit juices, but these can also be high in calories. The portion size of fruit juice is important. The consumption of 100% fruit juices should be limited to 4 to 6 ounces/day for children 1 to 6 years of age and 8 to 12 ounces/day for children 7 to 18 years.

1.5.1.4 Artificially Sweetened Drinks

The use of beverages sweetened with no- or low-calorie artificial sweeteners remains controversial, because they may perpetuate the habit of drinking sweetened beverages and may lead to a disconnect between perception and actual energy intake or to the displacement of nutrient-rich beverages. However, they can provide an alternative to full-calorie sodas. Because there is no evidence of benefits of these products over plain water, artificially sweetened beverages currently have a limited place in a child's diet. An example would be advising their use during a limited period of time to transition between full-calorie sodas and plain water, or when water is not available. The role of no- or low-calorie artificial sweeteners in children's beverages remains an area of ongoing research and debate. There is emerging evidence that nonnutritive sweeteners alter gut microbiota and increase glucose intolerance in humans.

1.5.2 Energy-Dense Foods

Increased caloric density of food (calories/g) has been associated with excessive caloric intake in laboratory studies in adults and children. Therefore, even without strong direct evidence for obesity-prevention benefits, a healthy diet should be rich in foods with low caloric density (vegetables, fruits, whole grains, low-fat dairy products, lean meats, lean fish, legumes) and limited in foods with high caloric density (fat-rich meats, fried foods, baked goods, sweets, cheeses, oil-based sauces). Furthermore, these choices have been shown to improve the cardiovascular risk profile, independent of obesity. Because such healthy diets are often time-consuming to prepare and sometimes more expensive than unhealthy food choices, families can benefit from consultation with a dietitian on food shopping, meal planning, and food preparation as well as advice on making healthy choices while eating outside the home.

1.6 Conclusion and Summary

The currently available evidence supports the following points:

- 1 The adoption and maintenance of healthful lifestyles must be emphasized as the basis for the prevention of obesity and other chronic health conditions.
- 2 Prevention of childhood obesity remains a public health priority, because obesity is the most prevalent chronic health condition in the pediatric population. Although many social sectors need to be mobilized to completely address this problem, pediatric primary care has a unique role to play, should be a resource for the community, and can be an integral part of the solution.
- 3 To address obesity prevention effectively in clinical practice, pediatricians should become familiar with the complex and interconnected factors that lead to excessive weight gain. They should understand how these factors play out in a developmental fashion and create important periods for preventive intervention. By better understanding the environmental determinants of obesity, including those that they cannot control, pediatric practitioners can improve their ability to provide recommendations that are relevant to patients and their families.
- 4 Most prevention strategies that can be used in pediatric practice have not been rigorously tested through scientific research. However, preliminary evidence, indirect evidence, and inferences from other settings provide clues to recommend evidence-informed approaches, especially those with low risk of a negative health effect or with other known health benefits.
- 5 Although the prevention messages are similar for all pediatric patients, counseling should be tailored to the child's developmental stage and the socioeconomic, cultural, and psychological characteristics of families.
- 6 Pediatric practice has a critical role in identifying children who are on the path to becoming obese by calculating BMI and plotting it on percentile charts at every health care visit. At-risk children can also be identified through the nutrition, sedentary behavior, and physical activities questions that are part of the *Bright Futures* templates as well as family history.

7 Education and advice alone are unlikely to be effective in most cases for obesity prevention. Pediatricians should, therefore, become familiar with other forms of interventions as they apply to obesity prevention, such as behavior-modification techniques, environment control approaches, or the promotion of improved parenting skills. They should also become familiar with the resources available in the areas they serve so that they are better suited to help each individual family.

There is no evidence for health benefits and some evidence for negative health effects of sweetened beverages (sodas, iced teas, sports drinks, juice drinks). Therefore, health-promotion efforts should aim at removing all sweetened beverages from the diets of children. The ideal beverage for children at all meals and during the day is water. Low-fat or fat-free, preferably unflavored, milk also has an important place in the diet of children beginning at 12 months of age. One hundred percent fruit juice should not be used before 1 year of age and should be limited thereafter. Fruits should be encouraged over fruit juice.

Promotion of a diet rich in foods with low caloric density (vegetables, fruits, whole grains, low-fat dairy products, lean meats, lean fishes, legumes) and poor in foods with high caloric density (fat-rich meats, fried foods, baked goods, sweets, cheeses, oil-based sauces) will likely contribute to the prevention of obesity.

All forms of sedentary entertainment, including television and newer forms of electronic entertainment or communication, should be excluded for infants and children up to 2 years of age and limited to 2 hours per day for children 2 years and older.

Promotion of active play and lifestyle and family- or sports-based moderate to vigorous physical activity for a total of 60 minutes/day is likely to contribute to the prevention of obesity and has multiple additional health benefits.

Prevention of childhood obesity should start before 2 years of age by promoting healthy maternal weight beginning in the prenatal period, smoking cessation before pregnancy, appropriate gestational weight gain and diet, breastfeeding and appropriate weight gain in infancy, transition to healthier foods with weaning, elimination of sedentary entertainment, active play for physical activity, and parental role modeling of healthy dietary and physical activity behaviors.

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