

Childhood Obesity: Solutions to Address a Growing Health Concern

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Abstract

Childhood obesity is an epidemic condition that leads to chronic disease in adulthood, including cardiovascular disease (CVD). "Cardiovascular disease is the #1 cause of death in the United States and other nations" and risk factors begin in childhood. According to the U.S. Department of Health and Human Services (HHS) Report on Health in the U.S. (2013), in 2011 - 2012, 20.5% of U.S. children aged 2 – 19 were classified as obese. Because of the rapid development of obesity in genetically stable populations, the childhood obesity epidemic can be primarily attributed to adverse environmental factors for which straightforward although politically difficult solutions exist. Researchers have found plant-based diets that limit added sugar and red meat, such as the Mediterranean diet, decrease the risk and incidence of chronic diseases including diabetes, CVD, and hypertension (HTN). In addition these diets can increase energy levels and sense of well-being and if started during childhood, may prevent chronic disease in adults.

Keywords: Childhood obesity; Obesity; Diet; Nutrition; Sugar

Introduction

The growing trend of childhood obesity is leading to an expanding population of people who are developing chronic diseases such as CVD, diabetes, and hypertension. According to the Center for Disease Control and Prevention (2014), many of these chronic diseases are preventable through a healthy, nutrient-dense diet that includes mostly vegetables, fruit, nuts and seeds and limited amounts of lean meats and dairy products [1-4]. Children who eat this type of diet are less likely to become overweight or obese [5,6]. This review will point out the financial, dietary, and health implications of childhood obesity. In addition, some causes of childhood obesity will be discussed and lastly will conclude with some suggestions for the health care provider to give to their patients on losing weight or maintaining a healthy weight starting in childhood. Some of these suggestions will also be of value to many adults as well. Obesity is not only a major contributor for chronic disease, but it is straining the economics of the health care system.

Economic impact

Health Affairs reports "there is an undeniable link between rising rates of obesity and rising medical spending". Billions of dollars are spent annually on health related problems from obesity with the average additional amount of \$1429.00 spent by an obese person compared to a normal weight person [7]. Unfortunately, media outlets repeatedly publicize high sugar; high fat products and children have become accustomed to wanting and ingesting these foods. Subsequently, many children are not eating a healthy diet and the prevalence of diabetes, obesity, and CVD is escalating at an alarming rate [2]. Adding to the problem, many parents work outside the home during the day, give their child money for meals away from home, and depend on their child's school to supply lunches, snacks, and physical activity. In addition, children are targeted through expensive marketing campaigns that promote fast, unhealthy foods virtually everywhere; TV, billboards, grocery stores, and the Internet.

Parents report difficulty finding affordable dietary and/or physical activity solutions that are attractive to their child and it is especially difficult when the child has passed from normal weight into overweight or obese. This can be attributed to the child becoming accustomed to eating certain amounts and types foods and entering the cycle of low energy that discourages exercise in addition to consuming low nutrient, high calorie, high sugar diets that in turn escalate the obesity

trend. Also, parental attitude may play a role as the research indicated some parents do not realize their child is overweight or perceive being overweight as a health threat or impedance to physical activity [8].

Dietary trends

Foods that contain added sugar are metabolized differently than other foods yet it is difficult to convey the effects of sugar calories when most people consider both types of foods to be the same in nutritional content. For example, a common belief is that people can maintain current weight by consuming the same amount of calories as one expends. Actually, this is not so – 100 calories of broccoli is metabolized differently than 100 calories of sugar-laden candy. The fiber contained in the broccoli slows absorption of the natural sugar and does not raise the blood glucose levels as high or as quickly as the candy bar, therefore does not create an increased insulin response that eventually leads to insulin resistance. Therefore, the metabolic effects of food probably matter as much as the actual energy content of the food [9].

Ludwig et al. demonstrated an association between sugar-sweetened drinks and obesity in children. They found children who drank sugar-sweetened drinks did not eliminate other forms of calorie intake when these drinks are part of their daily energy intake. In other words, the sugar-sweetened drinks merely added calories to the diet [10]. Sugar is metabolized differently in the body than vegetables and proteins and provides calories with no nutritional value or fiber. Fiber is important to include in the daily diet because it adds bulk to food, passes through the gastrointestinal tract to prevent constipation, slows absorption of sugar, may aid in weight loss, and appears to decrease the risk of certain cancers [11]. Plant-based diets are rich in fiber content and are associated with a significantly lower risk of renal cancer and other chronic conditions of diabetes, hypertension and obesity [12].

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So, fiber is essential to include in the diet, and when combined with the fructose in fruit, provides nutrition and energy.

Naturally occurring sugars in whole foods such as fruit include fructose; however fructose now comprises a significant portion of added sugars to foods and drinks. Fructose is different from other sugars in its ability to cause cellular energy depletion, nucleotide turnover (building blocks for RNA and DNA), and the generation of uric acid. Fructose is a component of added sugar products such as high fructose corn syrup and sucrose, which is found in many food items. Added fructose may increase the risk for obesity by altering satiety, which leads to an increased amount of food intake. The ingestion of fructose does not stimulate insulin and leptin secretion in humans, and therefore may not induce a satiety response since leptin sends a signal to the brain satiety is achieved. Other mechanisms may also be involved for example; ingesting high amounts of fructose induces leptin resistance in rats. Fructose also stimulates dopamine, a neurotransmitter in the brain that encourages food intake leading to an increase in unnecessary calories [9]. Fructose may also affect metabolic rate: A recent study in humans documented a reduction in resting energy expenditure in overweight and obese subjects fed fructose but not glucose [9]. It appears that when an individual becomes overweight or obese, attempts to lose weight may become more difficult due to disrupted satiety, lower metabolic rate, increased caloric intake, and lack of knowledge about healthy foods. An example of a product that has high levels of fructose would be orange juice which is generally regarded as healthy. Another common belief that is perpetuated in recent media is high fructose corn syrup (HFCS) is the major contributor of obesity, more so than sucrose, fructose, and other nutritive sweeteners. The glucose-to-fructose ratio in HFCS is approximately 1:1 which is similar to the ratio in sucrose, invert sugar, and honey. According to several studies, HFCS has no significant difference in metabolic effects including circulating glucose, insulin, postprandial triglyceride levels, leptin, and ghrelin than sucrose and other sugars. In addition, the research shows subjective effects of HFCS such as hunger, satiety, energy intake at subsequent meals and risk of weight gain was no different than that of other nutritive sweeteners [13-15].

The available scientific evidence suggests that high consumption of pure fructose may be problematic in the regulation of energy metabolism. However, HFCS has been shown to be more like sucrose than fructose in terms of its content, satiety responses, and metabolism that have been measured to date. Therefore, data suggests that fructose induced problems are not more related to HFCS than sucrose consumption [15]. Indeed, avoiding all types of added sugar might be more effective than eliminating one type of sugar in preventing weight gain or managing a healthy weight. The public is inundated with advertisements and marketing that puts sugar-laden foods and drinks in front of children who may then demand these products. Also, the connection between diet, genetics, environment and other aspects that lead to childhood obesity are often over-looked partly because of the reliance on pharmacotherapy and traditional medical interventions [4]. The general public appears to have become dependent upon the notion that the responsibility of their choices rests on others' claims and remedies and we have easily accepted the consequences, until now. Becoming more familiar and aware of the nutritional value in foods is paramount in controlling and/or reversing the obesity trend in children.

Health implications

Now there are more and more genetically stable children being diagnosed with Type 2 diabetes which was unheard of until recently and this is due to the obesity epidemic [3]. Health care providers and

researchers are reporting an increase in chronic diseases caused by obesity and steps are being taken to educate the public and help prevent this alarming trend. Diseases such as diabetes, CVD, and many cancers could be prevented by maintaining a healthy weight through a diet rich in vegetables, fruits, legumes, beans, nuts, seeds, with limited amounts of meat, added sugar, and dairy products [1,3]. To help create more awareness of the dangers of obesity, providing information to patients outlining the risks of specific cancers obesity can cause may help, just as it eventually did with cigarette smoking. Educating people of the risks of cancers such as breast, thyroid, kidney, endometrial and others related to obesity may be helpful because the general public may not realize the connection between obesity and cancer [16-19].

Additional conditions in children caused by obesity are hepatic steatosis, or fatty liver, and visceral obesity. Hepatic steatosis is associated with a greater intake of fat and fried foods, whereas visceral obesity is associated with increased consumption of sugar and reduced consumption of fiber in overweight and obese adolescents [20]. Additionally, findings of a recent study found overweight and obesity in school-age children was associated with Hispanic ethnicity, low socio-economic status, and grade; students in fifth grade were found to be more obese than those in kindergarten [21]. This indicates the possibility of preventing the obesity trend from escalating if the children and parents are educated on healthier food choices earlier in the child's life. The aforementioned diseases and conditions will persist throughout adolescence and into adulthood unless steps are taken to reduce body mass index (BMI) early and adopt a healthy lifestyle through increased intake of plants, fiber, and fruits along with adopting a physical activity level that is both effective for increasing energy and pleasant for the participant. If the diet and exercise routine is not gratifying for the person, it will not be sustained for long periods of time.

Suggestions for reducing BMI and improving health

- Eat 5 servings of fresh fruit and vegetables per day [22].
- Read labels and decrease the amount of added sugar in the daily intake to 6 tsp. or 100 calories for women a day, 9 tsp. or 150 calories for men per day [23].
- Limit or discontinue high calorie, high fat, high sugar, and low fiber food, snacks and meals [24].
- Increase physical activity in children to 87 – 127 minutes per day to decrease cardio metabolic risk [25].

Become aware of the many different names of sugar i.e. high fructose corn syrup, brown rice syrup, cane syrup, malt, sucrose, juice, etc. See Harvard School of Public Health webpage at <http://www.hsph.harvard.edu/nutritionsource/carbohydrates/added-sugar-in-the-diet/> [26].

- Limit or reduce the amount of sugary snacks and drinks, including soda and juice [8,9].
- Increase the amount of ready to eat fruit, nuts, seeds, and vegetables for snacks [6].
- Limit the amount of electronic engagement or "screen time" to no more than 1 – 2 hours a day for children 2 years old and over and encourage outdoor activities and sports [6,27].
- Decide with the child what lunch and snacks will consist of by providing healthy choices only and allowing them to choose between them.

- Visit health care providers including primary care providers, dietitians, and nutritional counselors for support and assistance in weight loss and/or healthy eating habits and exercise programs [6].

Conclusion

Because childhood obesity usually transitions into obesity in adulthood, efforts to prevent it should begin “long before a child enters school” [6]. The Institute of Medicine (2011) recommends health care providers measure height and weight at every routine visit using standardized tools such as growth charts from the World Health Organization (WHO) or the Centers for Disease Control and Prevention (CDC). This helps identify children at risk of developing obesity. In addition, evidence suggests increased exercise lowers the risk of children for becoming overweight or obese over time [6,23]. Introducing children to whole foods, plant-based and nutrient-dense diets in addition to adding outdoor activities requiring physical activity early in life may slow the growing trend of chronic diseases caused from obesity in adulthood and improve the overall health of our patients, families, and communities. Educating the community via public seminars, in schools, and at every office visit with a health care provider will increase understanding of healthy foods therefore allowing better decisions to be made regarding nutrition. Increasing physical activity and decreasing the amount of added sugar in the diet can decrease the risk and incidence of obesity that leads to chronic diseases including diabetes, CVD and HTN in children and ultimately adults.

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