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Medical education

Teaching residents and students to help patients and their families with obesity

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Analysis of the problem

In the past three decades, the proportion of children and adolescents in the United States who are overweight has tripled. With nearly one of every three children now exceeding a healthy weight, overweight has become the most common chronic medical condition of childhood in the U.S. [1]. As a predisposing factor for the development of cancer, type 2 diabetes mellitus, cardiovascular disease and other chronic diseases, obesity across all populations has been estimated to account for more than \$100 billion per year in treatment costs and about 117,000 preventable deaths annually. At current rates of childhood obesity, it has been predicted that about one of every three children born in the U.S. in 2000 will develop type 2 diabetes during his or her lifetime [2]. The expected lifetime prevalence of diabetes among African American, Asian American and Hispanic children will be even higher, foreshadowing an impending public health crisis [2].

Not only is obesity an important early risk factor for much of adult morbidity and mortality, but medical problems including hypertension and dyslipidemia are common in obese children and adolescents [3]. The relative risk for disordered sleep breathing (DSB) (obstructive sleep apnea/hypoventilation syndrome) in obese children is five times that of those with normal weight [4]. DSB can result in attention deficit hyperactivity disorder (ADHD), hypersomnolence, irreversible cognitive defects, school failure and pulmonary hypertension [5]. Chronic systemic and pulmonary hypertension may lead to the development of cardiomyopathy with increased risk of congestive heart failure, cor pulmonale and arrhythmias [4].

Obesity, in particular excess central or visceral adiposity, is associated with insulin resistance at the level of skeletal muscle, which, in turn, is associated with a spectrum of disorders, including acanthosis nigricans (a velvety hyperpigmented rash most commonly found on the neck and axillae), fatty liver disease, polycystic ovary syndrome (the most common cause of amenorrhea and infertility) and type 2 diabetes mellitus (T2DM) [2]. Though once uncommon in children, T2DM now accounts for up to 50 percent of all cases of newly diagnosed childhood diabetes [6].

Nonalcoholic fatty liver disease (NAFLD) is the most common form of liver disease in children, with obesity as the single greatest risk factor. Though frequently silent,

NAFLD may present with abdominal pain, hepatomegaly or abnormal transaminase levels. Up to 15 percent of cases progress to cirrhosis and liver failure [7]. The kidneys can also be affected, with obesity-related focal segmental glomerulosclerosis in our population increasing tenfold, in parallel with the rise in pediatric obesity [8].

Misalignment of the lower-extremity joints and musculoskeletal pain are more common in obese children than in lean children. Significant joint problems that may require surgical intervention, including Blount's disease (idiopathic tibia varus) and slipped capital femoral epiphysis, are also associated with obesity [9].

Many studies have found that obese children are at significantly higher risk than their lean counterparts for experiencing poor psychological well-being, including low self-esteem, depression and low health-related quality of life (QOL) scores [10]. In some instances, obese children have QOL scores similar to those of children diagnosed with cancer and receiving chemotherapy. QOL scores and the degree of obesity are inversely correlated. Similarly the QOL scores in obese children with symptomatic comorbidities, such as orthopedic complications or obstructive sleep apnea, also tend to be significantly lower [11].

Approach to teaching

As an American journeying to a Scandinavian country I noticed only an occasional person who could be regarded as moderately overweight. Back home, at the facility for mostly impoverished patients where I spend my clinical hours, I tend instead to notice the rare underweight patient who might present for an evaluation. The problem of overweight and obesity in the United States has become so pervasive that it appears almost normal, as Dr. Collier has explained in the analysis above. How then do we teach our students to deal with this problem and the attendant issues previously noted?

The medical system in the United States has often been said to be not a health care system but an illness care system. This may be especially true with the problem of obesity since its best hope for cure lies in prevention. While the point at which this prevention should start is often discussed, as a pediatrician, I choose to start at the time most relevant to my practice, the birth of the child.

We begin by providing our students with detailed information that enables them to counsel and work with new mothers who are endeavoring to breast feed their infants, since "breast is best." We also teach them about community and other resources that can assist them and their patients in this effort.

Some new mothers don't breast feed, or they use both breast milk and formula, and for them we must give more structured guidelines about the number of calories (100-120 per kilo) that the newborn and young infant need each day for optimum growth. We also provide an end point for parents, with a range of ounces per day. We then monitor length and weight and show parents these points plotted on a growth curve,

along with the body mass index (BMI). We inform parents that doubling of birth weight is not expected until about six months and tripling, not until about one year.

At the age of one year, growth becomes less rapid, but many parents have difficulty understanding that during the second year children will appear to eat less than they had previously. A simple teaching point helps to make parents more comfortable with this decrease. Using as an example a child born at seven pounds, we note that the child would ordinarily be approximately 21 pounds at one year of age. If the child continued eating the same relative quantity of food during the second year and beyond, the child would be 63 pounds at two years of age and 189 pounds at age three. This provides an image that the most and least sophisticated of parents can grasp.

We teach that parents must be aware of others who feed their children. This is particularly true in out-of-home child care situations where high-calorie, high-fat convenience foods are often the mainstay of meals provided. Beyond this we teach that water is the preferred beverage and that “fast food” should be regarded as an occasional treat and not a regular part of a daily or even weekly diet. Parents are asked to consider fiber-dense fruits and vegetables as the preferred snack. Other snack foods should be available in the home only infrequently, and children should be monitored in their spending for snacks outside the home.

Students are taught that this is a family issue—regardless of the body habitus of the family members. We provide examples of inexpensive, culturally sensitive, healthful diets for the family and make formal nutrition counseling available if and as needed.

Finally, we encourage exercise, preferably as a family, with attention to the unfortunate fact that some neighborhoods are not safe for unmonitored children. Related to the emphasis on exercise is the suggestion that media of all types be restricted to one to two hours per day. Meals should be eaten as a family with attention to each other and not to a television program. Since sleep is also essential for appropriate growth and development, we teach that television and other media should not be available in a child’s room or for that matter in any unmonitored place.

If all of the things noted here had been done for Robert and his family, (see [“Childhood obesity.”](#)) beginning at the time of his birth, he would not likely be a clinical case for discussion in this issue of *Virtual Mentor*, and if he were, both he and his parents would be concerned about the problem and eagerly searching for a solution.

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