CHAPTER

18 Nutrition Through the Life Cycle: Childhood and Adolescence

Chapter Summary

Toddlers grow more slowly than infants but are far more active. They require small, frequent nutritious snacks and meals. Energy, fat, and protein requirements are higher for toddlers than for infants. Until age 2, toddlers should drink whole milk rather than reduced-fat milk, and they are still at risk for choking and allergies. Toddlers fed vegan diets may suffer from deficiencies. Preschoolers and school-aged children are more independent and can make more of their own food choices. Their physical growth is slow and steady, and physical activity levels can vary dramatically between children.

Sexual maturation begins during the early school-age years. Children's fat intake should be 25–35% of their total energy intake, and carbohydrate intake should be 45–65% of total energy. Calcium needs increase as the child grows, and iron needs decrease slightly, although prevention of iron deficiency still remains a concern. School lunches are nutritious and must meet federal guidelines, but the foods that children choose to eat can be high in fat, sugar, and energy, and low in nutrients. Peer pressure affects food choices and body image.

Families experiencing food insecurity can be referred to agencies that provide aid. Adolescents experience rapid increases in height, weight, and lean body mass and fat mass, as well as psychosocial changes related to puberty. Energy needs for adolescents are variable, but fat and carbohydrate recommendations mimic those of adults. Many adolescents replace whole grains, fruits, and vegetables with fast foods and high-fat/high-energy snack foods, placing these adolescents at risk for deficiencies for calcium, iron, and vitamin A. Calcium is needed to optimize bone growth, and iron needs are increased because of increased muscle mass in boys and menstruation in girls.

Disordered eating behaviors, eating disorders, personal appearance, cigarette smoking, and use of alcohol and illegal drugs are concerns for adolescents. Overweight and obesity can begin to develop at any time from toddlerhood through adolescence if energy intake exceeds energy spent in physical activity. Both families and schools are important in prevention of childhood obesity.

Nutrition Myth or Fact addresses the question: Bariatric surgery for adolescents: Is it the answer?

Learning Objectives

After studying this chapter, the student should be able to:

1. Describe the key nutrient needs of toddlers (pp. 708–711).

2. Discuss strategies for encouraging toddlers to eat nutritious foods and the suitability of vegetarian diets for toddlers (pp. 712–715).
3. Identify the growth and activity patterns and specific nutrient needs of preschool and school-age children (pp. 715–719).
4. Discuss food choices, food insecurity, and other nutritional concerns affecting children (pp. 719–721).
5. Explain how school attendance and school lunch programs affect children's nutrition and health (pp. 721–724).
6. Describe the key nutrient needs of adolescents, taking into account their psychosocial development and growth and activity patterns (pp. 724–726).
7. Discuss food choices, disordered eating patterns, and other nutritional concerns affecting adolescents (pp. 726–729).
8. Describe the health problems associated with pediatric obesity and the etiology of the problem (pp. 729–731).
9. Discuss the dietary and activity options for preventing childhood obesity, including the roles of family and school (p. 731-732).
10. Identify a range of options for treating moderate and severe obesity in children (pp. 732–735).

Key Terms

bariatric surgery
epiphyseal plates
menarche
puberty

Chapter Outline

I. What Are a Toddler's Nutrient Needs?

A. As activity expands, more energy is needed.

1. Toddler growth and activity patterns shift from those of infants.

a. They expend more energy to fuel increasing levels of activity.

2. Energy and macronutrient recommendations remain high for toddlers.

a. The estimated energy requirement (EER) varies according to the toddler's age, weight, and level of activity.

b. Recommended fat intake is 30–40% of a toddler's total daily Calories to provide a concentrated source of energy and promote nervous system development.

c. The RDA for protein for toddlers is 1.1 g/kg body weight.

d. Adequate fiber from complex carbohydrates with moderate sugar and juice intake are recommended.

3. Micronutrient recommendations for toddlers increase as they grow.

a. Micronutrients associated with fruits and vegetables are of particular concern.

b. Vitamin D is important and may need to be supplemented in those who don't consume enough fortified dairy products.

c. Calcium is necessary for children to promote optimal bone mass.

d. Because iron deficiency anemia is a concern, toddlers need a daily source of heme iron or non-heme iron and vitamin C sources together.

4. Fluid recommendations for toddlers prevent dehydration from high activity.

B. Food choices should be appropriate, nutritious, and fun.

1. As long as healthful food is abundant and choices varied, toddlers have an innate ability to match their intake with their needs.

2. Toddlers need small meals, interspersed with nutritious snacks, every two to three hours and may not sit still until they finish every bite.

3. Foods should be developmentally appropriate and fun.

C. New foods should be introduced gradually throughout toddlerhood.

1. Toddler should be encouraged to try one bite.

2. Modeling is important, so parents should enjoy a variety of healthful foods.

3. When appropriate, toddler should assist in food preparation.

D. Vegetarian diets should be planned with care.

1. Vegetarian families must take care to provide for nutrient needs of toddlers.

a. Lacto-ovo vegetarians must be careful to include enough zinc and iron from other sources in their child's diet.

b. For toddlers, a vegan diet poses risks, and can easily provide inadequate protein, iron, zinc, calcium, vitamin D, and vitamin B_{12}.

c. Large amounts of fiber lower absorption of iron and zinc can give a toddler an inaccurate sense of satiety.

Figures and Table:

Figure 18.1: Portion sizes for toddlers and preschoolers are much smaller than for older children.

Figure 18.2: Label guidelines for foods targeting children under the age of 2 differ from the guidelines for foods for older children and adults.

II. What Are a Child's Nutrient Needs?

A. Childhood growth and activity boosts energy-nutrient needs.

1. Energy requirements increase due to increasing size.

2. Activity levels vary, and children of all ages should be encouraged to participate in physically active play suited to personal choices.

3. Macronutrient, fiber, and micronutrient recommendations are grouped together for ages 4 through 8.

4. At the onset of sexual maturation, the nutrient needs of boys and girls differ.

5. Energy and macronutrient recommendations for children increase throughout childhood.

a. Percent of Calories from fat should gradually decrease to adult recommendations, avoiding overemphasis on fat restriction.

b. Forty-five to 65% of Calories from fibrous carbohydrates can be met with whole grains, fruits, vegetables, and legumes.

c. Protein needs are higher than adult needs but are easily met with dairy, meat, fish, and poultry or vegetarian protein.

B. Micronutrient recommendations for children increase with age.

1. Although micronutrient requirements increase slightly up to age 8, the sharpest increase occurs during the transition years approaching adolescence.

2. Inadequate daily intake of fruits and vegetables may cause deficiency of vitamins A, C, and E and inadequate fiber and potassium.

3. The RDA for calcium is increased even more in later childhood years when milk displacement can be problematic.

4. The RDAs for iron and zinc increase slightly for preschoolers and then drops slightly from ages 9 to 13.

5. An age-appropriate multivitamin/mineral supplement helps to make up for inadequate intake for any reason.

C. Fluid recommendations vary according to level of physical activity and weather conditions, but average about 5 to 8 cups of beverages per day.

Figure:

Figure 18.3: The MyPlate Food Plan provides families with an easy-to-use guide for healthful meals.

III. What Are Some Common Nutrition-Related Concerns of Childhood?

A. Parents can model nutritious food choices.

1. Encouraging nutritious food choices in children involves teaching some basics.

a. Autonomy, access to spending money, and influence of TV and peers all impact eating habits of children.

2. Body-image concerns become increasingly important as children approach puberty.

a. Encouraging the concept of being physically fit and healthy at a variety of weights promotes a healthy body image.

b. Excessive concern with thinness can lead to fad dieting, food restriction, and disordered eating.

3. Role modeling, planning family meals together, and talking about healthy eating offer compromises and balance.

B. Iron-deficiency anemia affects many children.

1. If left untreated, iron deficiency can lead to behavioral, cognitive, and motor deficits, developmental delays, and impaired immune response.

2. In those children exposed to lead, iron deficiency increases the rate of lead absorption and severity of lead toxicity.

3. Regular dietary assessments and simple blood tests, along with preventive measures, assure healthy, ready learners.

C. Millions of American children experience food insecurity and hunger.

1. Without an adequate breakfast, children will not be able to concentrate or pay attention.

2. Impaired nutrient status can blunt children's immune responses.

3. Food insecure households can cause maternal depression that often leads to poor mental health outcomes in the child.

4. Options for families facing food insecurity include government- and privately funded programs.

Figure:

Figure 18.4: "Eat Better, Eat Together" promotes family mealtimes as a way to improve children's diets.

IV. How Does School Attendance Affect Children's Nutrition?

A. School attendance can reduce intake of nourishing food.

1. Skipping breakfast may affect attention span and schoolwork.
2. With no one monitoring what they eat, children do not always consume adequate quality or amounts of food.
3. Many schools now offer recess before lunch so that children won't rush through lunch in order to spend more time on the playground.
4. Many school districts and states now limit soft drink and snack sales during the school day, but others still offer such foods.

B. School attendance can boost children's access to nourishing foods.

1. The federal School Breakfast Program (SBP) and the National School Lunch Program (NSLP) provide funding to states to establish local nonprofit breakfast and lunch services.
2. The USDA encourages schools to offer "in-class breakfast," which is free to all students removing the stigma associated with cafeteria breakfast programs.
3. School meals are required to meet the nutritional standards of the 2010 Healthy, Hunger-Free Kids Act (HHFKA).
4. The actual proportion of nutrients a student gets depends on what the student actually eats.
5. Many schools are working to ensure a more healthful food environment.
   a. School districts are required to develop wellness policies that address nutrition, increasing healthful options at school.
   b. Many schools now cultivate gardens and eat the harvest.

V. What Are an Adolescent's Nutrient Needs?

A. Adolescence is a period of dramatic change.

1. Adolescence begins with the onset of puberty and continues through age 18.
2. Adolescent psychosocial development is characterized by increasing independence, which may affect their nutrition.
3. Adolescent growth and activity patterns are primarily driven by hormonal changes.
   a. Growth spurts occur during later childhood and adolescence.
      i. Average girls are almost full height by onset of menarche while boys continue to grow throughout adolescence.
   b. Skeletal growth ceases once closure of the epiphyseal plates occurs.
   c. Weight and body composition also change dramatically during adolescence and are variable, reflecting energy intake, physical activity level, and genetics.
4. Physical activity levels are highly variable.

B. Adolescents' nutrient needs reflect their rapid growth.

1. Energy and macronutrient recommendations for adolescents reflect the need to support dramatic growth and maturation and fuel physical activity but are similar to adult needs.

C. Micronutrient recommendations for adolescents include increased calcium, iron, and vitamin A.

D. Fluid recommendations for adolescents are higher due to their higher physical activity levels and to their extensive growth and development.

Figure:

Figure 18.5: Skeletal growth ceases once closure of the epiphyseal plates occur.

VI. What Are Some Common Nutrition-Related Concerns of Adolescence?

A. Most adolescents choose their own foods.

1. Encouraging nutritious food choices with adolescents is complicated largely by independence.

a. Lack of vegetables, fruits, and whole grains in the adolescent diet is common, and parents can encourage healthy versions of preferred food.

b. Teens should also be encouraged to consume adequate milk and other calcium-enriched beverages.

B. Disordered eating is a common concern of adolescence.

1. Disordered eating frequently begins during adolescence, and adults should be watchful of warning signs.

2. Parental eating habits strongly influence the eating practices of children.

C. Adolescent acne is not known to be linked to diet.

1. Diet has virtually no role in the development of acne; it is primarily a hormonal-related issue.

2. A healthful diet can provide vitamin A, vitamin C, zinc, and other nutrients to optimize skin health and maintain an effective immune system.

D. Substance abuse has nutritional implications.

1. Cigarette smoking diminishes appetite, interferes with metabolism of some nutrients, reduces physical activity, and increases the risk of chronic disease in adulthood.

2. Alcohol can interfere with proper nutrient intake, absorption, and metabolism and lead to nutrient deficiencies.

Key Terms: puberty, menarche, epiphyseal plates

VII. What Makes Pediatric Obesity Harmful, and Why Does It Occur?

A. Pediatric obesity leads to serious health problems.

1. Children are considered obese when BMI is at the 95th percentile or above.

B. Even in early childhood, significant overweight can exacerbate asthma, cause sleep apnea, impair the child's mobility, and lead to intense teasing, low self-esteem, and social isolation.

1. Obesity increases risk for fatty liver, type 2 diabetes, high blood lipids, elevated blood pressure, metabolic syndrome, and other medical problems.

C. Pediatric obesity is multifactorial.

1. Obesity in children results from a complex interaction of genetic, environmental, and sociocultural factors.
    a. A child's weight or BMI is closely related to parental weight or BMI.
        i. Genetic risk factors can be overcome through coordinated effort.
    b. Lower parental income and environmental factors such cultural influences and access to playgrounds and grocery stores with healthy foods also play a role in pediatric obesity.

VIII. Can Pediatric Obesity Be Prevented or Treated?

A. A healthful diet can prevent pediatric obesity.

1. The introduction and retention of healthful eating and activity habits are key to preventing childhood obesity.
2. The role of the family in healthful eating includes:
    a. Consistently providing nutritious food choices, encouraging a healthful breakfast, and sitting down to shared family meals
    b. Encouraging attentive, television-free eating and true enjoyment of the food
    c. Parents retaining control over purchase and preparation of food until children are responsible and knowledgeable enough to make healthful decisions
    d. Minimizing the number of meals eaten in restaurants, especially fast-food franchises
    e. Not allowing the dinner table to turn into a battleground
    f. Modeling healthful eating behaviors
3. The role of the school in healthful eating includes:
    a. Eliminating or restricting the sales of soda, candy, and pastries
    b. Taking advantage of nutrition education programs offered through health agencies
    c. Providing consistent, repeated nutrition messages

B. An active lifestyle can help prevent pediatric obesity.

1. Increased energy expenditure through increased physical activity is essential for successful weight management among children.
2. Overweight children are more likely to engage in physical activities that are noncompetitive, fun, and structured to their own pace.
3. The role of the family in physical activity includes:
    a. Being active together and encouraging activity throughout the day
    b. Limiting television watching and electronic gaming to no more than two hours per day
    c. Locating safe, structured, supervised after-school programs that offer physical activities when parents cannot be home
4. Many physically active, overweight children can "catch up" to their weight as they grow taller, without restricting food intake.
5. The role of the school in physical activity includes:
    a. Realizing that physical fitness promotes academic success and that recess improves classroom behavior
    b. Optimizing opportunities for physical activity within the schools
    c. Daily physical education
    d. Non-competitive physical activity options outside of school

C. Pediatric obesity does respond to treatment.

1. Treatment options are offered according to a staging system.

a. Stage 1: Lifestyle modifications to improve dietary intake while decreasing energy intake and to increase physical activity while decreasing sedentary behaviors.

b. Stage 2: Consultations with a Registered Dietitian Nutritionist, more specific behavioral goals, adoption of self-monitoring, and visits with the primary healthcare provider.

c. Stage 3: Expands the care team to include a member devoted to behavioral health and an exercise specialist; the child visits with a healthcare provider weekly.

d. Stage 4: Pharmacotherapy or bariatric surgery.

Key Term: bariatric surgery

Table:

Table 18.2: Examples of Physical Activities for Children and Adolescents

Activities

1. Give students some time to share what eating was like growing up in their house. Explain that we learn how to feed our children from our parents and caretakers, so there is no right or wrong way. However, some ways seem to be more successful. On her website (www.ellynsatter.com/), Ellyn Satter provides an approach coined "Parents Provide, Children Decide." Explore this role delineation in feeding in contrast to others. What are its benefits? What are the barriers to using it? Would you use it with your children? Why or why not? Note: Having presented this activity in the past, I find that many students have difficulty "buying in" to this plan and even take offense. Many students will be confronted with their own disordered eating. Be prepared to present this with a great deal of sensitivity.

2. Have students watch one hour of children's television and keep track of non-nutritious versus nutritious food commercials. Discuss the marketing strategies used to attract children's attention. In addition, students should track body image messages and promotion of physical activity, in both commercials and programs. Discuss their findings.

3. Have students place themselves in the shoes of someone trying to raise a young family on welfare. They must first investigate local programs that aid children of all ages in obtaining adequate, healthy food. How do they provide aid (food, vouchers, and so on)? Are the programs well publicized and easy to contact? What are the qualifications? Are the foods provided nutritious, and/or do the programs provide families with education on selecting healthy choices?

4. Have students visit nutrition websites for kids and evaluate the information provided and the likelihood that these sites will promote healthful eating and physical activity. Discuss the students' findings. Some possible websites are listed throughout the chapter.

5. A large percentage of women under 23 years of age with little or no income are raising more than one child. In addition, many middle and high school children are raising their younger siblings for various reasons. Have students investigate local school programs that are provided to educate students on parenting, family nutrition, and consumerism. Discuss the value of beginning this education well before high school and reinforcing it

regularly. Have students suggest ways that such information could be incorporated into required subject matter, and discuss the barriers to offering such education.

Diet Analysis Activity

6. Have students choose a local lunch from a school lunch menu that you provide (these can be found on the school website) to evaluate using their diet analysis software. You can assign them different age groups for the analysis, and this can be done prior to class to stimulate class discussion. Ask them to note which nutrients are low and which are high. Does the menu meet the requirements of the School Lunch Program? They should then evaluate the nutrient density of this meal and suggest improvements.

Nutrition Debate Activity

7. Have students research the differing views on childhood obesity, then divide the class into small groups. Each group must develop one plan for preventing new cases of overweight and obesity in children. You may have to assign possible strategies to get a good variety. In a simulation of a community health coalition, announce that the goal of this meeting is to consider each proposed strategy and decide what strategy will be initiated first in the community. Each group will explain their strategy and why it should be initiated first. They will try to persuade the other members of the coalition to side with them. As the discussion progresses, allow students to form alliances and propose compromises. At the end of the debate, determine the most popular proposals, and briefly discuss these options. Then have the students vote for the strategy they feel is most likely to succeed as an initial approach to the community problem.

Web Resources

We Can!
http://www.nhlbi.nih.gov/health/educational/wecan/

Girls on the Run
www.girlsontherun.org

Vegetarian Resource Group
http://www.vrg.org/family/kidsindex.htm

Milk Matters
www.nichd.nih.gov/milk

USDA MyPlate—Kid's Place

www.choosemyplate.gov/kids/index.html

USDA Food and Nutrition Services
www.fns.usda.gov

Academy of Nutrition and Dietetics
www.eatright.org

