Childhood Obesity and Health Implications Through Life

Jennifer Riden APRN-BC
Knoxville Orthopaedic Clinic
Today about 1 in 3 kids is overweight or obese. And studies show that overweight kids are likely to become overweight and obese adults.
Defining Childhood
Overweight and Obesity

- Centers for Disease Control (CDC) 2015 defines Body Mass Index (BMI) as the primary/practical measure to determine overweight and obesity.
- BMI is measure of weight in relation to height and used to determine weight status.
Today, about 1 in 3 children and adolescents is overweight with BMI in 85th-95th percentile for age and sex or obese with BMI above 95th percentile (Ludwig, 2014)

National Health and Nutrition Examination Survey (NHANES) in 2010-2012 estimated that 17% of children and adolescents ages 2-19 are obese

Obese children and adolescents more likely to become obese as adults.
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**Facts**

- More than 1 in 3 children is overweight or obese in the State of Tennessee.
- Tennessee now has the 14th highest adult obesity rate in the nation.
- 2-4 yr old from low income families – 14.2%
- 10-17 yr olds – 20.5%
- High School Students – 18.6%
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- Many Medical Issues:
  - Diabetes
  - Asthma
  - Cardiovascular
  - Sleep Apnea
  - Emotional Issues
  - Orthopedic
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- Diabetes
  - Type 2 diabetes was once called adult-onset diabetes. Now with the rise in childhood obesity, there is a dramatic rise in the number of children suffering from type 2 diabetes. Untreated, this can be a life-threatening condition.
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- Asthma
  - Extra weight can make it harder to breathe and can inflame the respiratory tract. There is a rise in childhood asthma and children with serious asthmas are more likely to be overweight
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- **Cardiovascular**
  - Being overweight makes the heart work harder. Overweight children are more likely to grow up to be overweight adults who develop heart problems.
  - Obesity can lead to increased lipid levels which can lead to coronary artery blockage.
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- **Sleep Apnea**
  - A person stops breathing during sleep usually caused by obstructing or blocking the upper airway.
  - It is a common condition that can make kids miss out on healthy, restful sleep and if untreated can lead to learning, behavior, growth and heart problems.
  - Risk Factors include family history, being overweight and defects in the structures of the mouth, jaw or throat that narrow the airway.
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- Emotional Toll of Obesity in Children
  - Social Stigma
  - Self-Esteem & School Bullying
  - Depression
  - Emotional Eating
  - Discrimination
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- Contributing Factors to Childhood Obesity
  - Television and Media
    - Screen time is a major factor. It takes away from children being physically active which leads to increased snacking as well
  - Marketing of Unhealthy Foods
    - Nearly half of the US middle and high schools allow advertising of less healthy food which impacts students’ ability to make healthy food choices.
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- Contributing Factors
  - Limited Access to Healthy Affordable Foods
    - In rural, low income neighborhoods there is less access to healthy, affordable foods. There are more convenience stores and fast food restaurants. Supermarket access is associated with a reduced risk for obesity
  - Lack of Daily Physical Activity
    - Physical Activity Guidelines for Americans recommend at least 60 minutes of aerobic physical activity each day
  - Increased Portion Sizes
    - Portion sizes of less healthy foods and beverages have increased over time in restaurants, grocery stores and vending machines
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Contributing Factors

Higher Consumption of Sugary Beverages

- Sugar drinks are the largest source of added sugar in the diets of children and adolescents. They offer little to no nutrients and cause increased rates of childhood obesity.
- A fifth of teens drink the equivalent of an extra meal in sugar sweetened beverages.
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- Orthopedic Complications
  - Spinal
  - Slipped Capital Femoral Epiphysis (SCFE)
  - Blount Disease
  - Fracture Risk

- School Nurses, Physical Education professionals, and Trainers need to understand orthopedic consequences of obesity
Orthopedic Complications of Obesity in Childhood/Adolescence

- Spinal

  - The weakest part of spinal segment in adolescents is the growth plate
  - Overload and stresses on the lumbar spine show a positive link between increased weight and low back pain (Willis, 2012)
  - This can lead to rupture of a disc or a vertebral fracture in adults
Orthopedic Complications of Obesity in Childhood/Adolescence

- Slipped Capital Femoral Epiphysis (SCFE)
  - SCFE is a change in the anatomic relationship of the femoral head with its neck and shaft due to an epiphyseal plate disruption and occurs in 2 ways:
    - Shear force of the capital femoral growth plate increase quickly and femoral head suddenly separates
    - Increases shear force, chronically, causes a gradual slip
    - Both usually occur before growth plate closure
Childhood Obesity
SCFE
Orthopedic Complications of Obesity in Childhood/Adolescence

- Body weight may be strongly associated with the occurrence of SCFE
  - One study has shown that half of the participants with SCFE were in or above the 95th percentile
  - Chung described a 72% rate of obesity in children with SCFE
  - Many times SCFE involves both hips usually about 1 year lapsed between initial occurrence and second SCFE
Orthopedic Complications of Obesity in Childhood/Adolescence

- **Blount Disease**
  - Skeletal disorder affecting the medial side of the proximal tibial epiphysis causing a varus deformity of the tibia
  - Characterized by bowed legs and tibial torsion
  - Usually begins in children between 1 and 3 years of age
  - Obesity has been linked with the prevalence and degree of angulation of the deformity
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Blount Disease

Blount's Disease most often affects the lower leg bone i.e. tibia which is also more commonly recognized as shin bone.
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Blount Disease
Orthopedic Complications of Obesity in Childhood/Adolescence

- Usually requires multiple osteotomies
- Theory is that massive weight gain in adolescents with underlying Blount disease could lead to excessive medial compartment loading and altered physeal growth
Orthopedic Complications of Obesity in Childhood/Adolescence

- Fracture Risk
  - Peak fracture incidence in children coincides with growth spurts
    - Due to weight/bone mass imbalance which may place high levels of stress on growing bones and joints
    - Lack of exercise can be a factor in pathogenesis of obesity contributing to risk of fracture
    - Overweight or obese children may fall with more force and in a more awkward manner than children of normal weight.
Complications of Obesity in Childhood/Adolescence

- Immediate Consequences (2-5 years)
  - Most organ systems begin to be affected
  - Unfused growth plates and softer cartilage in bones of children contribute to orthopedic abnormalities
  - Emotional development is highly affected by being described as lazy, lying, cheating, sloppy, dirty, ugly, and stupid, and usually ranked as least desired friends
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Intermediate Consequences (ages 5-11)

- Increased blood pressure in obese boys and girls above 90th percentile
- Increased total cholesterol and LDL-cholesterol levels
- Increased incidence of non-insulin dependent diabetes
- Persistent obesity is likely to contribute to adult obesity and furthering health problems
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- **Long Term Consequences**
  - Morbid consequences of adolescent overweight were studied and show that risk of heart disease, colon cancer and gout were increased in adults
  - Increased risk of arthritis, hip fracture and difficulty with activities of daily living were also elevated primarily in female adults with obesity as adolescents
  - SCFE can cause full blown arthritis as adults which may require hip replacement
Prevention and Advocacy is Key

- Pediatricians, School Nurses, Physical Education Teachers and Trainers can all play a leadership role in this critical area of child health

- Opportunities:
  - Physical activity: Health and fitness promoting programs
  - Nutrition programs
  - Behavioral Health
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- Good news that in Tennessee, more than 610 schools across the state have joined the Alliance’s Healthy Schools Program (see link)
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Where to Begin?

Schools are our children’s lifeline where they begin to learn healthy habits for a lifetime.

Change starts with a single step such as removing sugary drinks from vending machines or walking to school rather than taking the bus or driving.

Other suggestions for change in schools:

- School gardens, nutritious snacks, water dispensers and opportunities to be active throughout the day.
- Staff as role models – Employee Wellness Programs.
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Where to Begin?

- Out of school time – Keeping children active with after school activities that do not involve television and media

- Health Education is integral to the primary mission of schools.
  - Can reduce youth health risk behaviors such as poor nutrition and lack of physical activity
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Questions?

Resources

- Alliance for a Healthier Generation
  - https://www.healthiergeneration.org

- Centers for Disease Control and Prevention
  - http://nccd.cdc.gov

- Healthy Children
  - https://healthychildren.org

- State of Obesity
  - http://stateofobesity.org/states/tn/