THE EVOLVING TREND OF TEENAGE OVERWEIGHT/OBESITY: THE TENNESSEE EXPERIENCE

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LEARNING OBJECTIVES
- The Evolving Trend of Teenage overweight/obesity
- Appreciate the trend, contributing factors and consequences of Teen overweight/obesity in Tennessee
- Review AAP recommendations on obesity prevention, assessment and treatment at the point of care
- Family protocol for obesity preventions
OUTLINE

- Defining Childhood Overweight and Obesity
- Obesity Prevalence
- Contributing Factors
- Consequences
- References

DEFINITION

- The imbalance between calories consumed and calories expended
- Can result from the influences of a number of factors: genetic, behavioral, and environmental factors
- It is the interactions among these factors – rather than any single factor – that is thought to cause obesity

BMI

- BMI is used as a screening tool to identify possible weight problems for children
- CDC and the American Academy of Pediatrics (AAP) recommend the use of BMI to screen for overweight and obesity in children beginning at 2 years old
- BMI is not a diagnostic tool!

Measurement Units

<table>
<thead>
<tr>
<th>Measurement Units</th>
<th>Formula and Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilograms and meters (or centimeters)</td>
<td>Formula: ( \text{weight (kg)} / [\text{height (m)}]^2 ) With the metric system, height is commonly measured in centimeters, an alternate calculation formula, dividing the weight in kilograms by the height in centimeters squared, and then multiplying the result by 10,000</td>
</tr>
<tr>
<td>Pounds and inches</td>
<td>Formula: ( \text{weight (lb)} / [\text{height (in)}]^2 \times 703 ) When using ounces (oz) and fractions must be changed to decimal values</td>
</tr>
<tr>
<td>Weight Status Category</td>
<td>Percentile Range</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Underweight</td>
<td>Less than the 5th percentile</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>5th percentile to less than the 85th percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85th to less than the 95th percentile</td>
</tr>
<tr>
<td>Obese</td>
<td>Equal to or greater than the 95th percentile</td>
</tr>
</tbody>
</table>

**ASSESSMENTS**

- Obesity assessments might include
- Skin fold thickness measurements
- Evaluations of diet
- Physical activity
- Family history
- Other health screenings
- Complete Physical examination
Trends in Childhood Obesity

Rising prevalence of overweight children (5-11)

IOTF: International Obesity Task Force

Obesity Trends* Among U.S. Adults
BRFSS, 1985
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

1990
2009

No Data          <10%           10%–14% 15%–19%           20%–24%          25%–29% ≥30%

Obesity Trends* Among U.S. Adults
(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)
PREVALENCE

- Overweight/obesity is a serious health concern
- Healthy People 2010 identified overweight and obesity as 1 of 10 leading health indicators
- Progress toward reducing the national prevalence of overweight and obesity is monitored using data from the National Health and Nutrition Examination Survey (NHANES).

PREVALENCE

- Between 1976-1980 and 1999-2000, the prevalence of obesity increased
- 2007-2008 NHANES showed among 2-19 years old ↑ 17% obese
- Between 1999-2000 and 2007-2008, there was no significant trend in obesity prevalence for any age group
Contributing Factors

- **Genetic:** The genetic characteristics of the human population have not changed in the last three decades.

**Behavioral Factors**
- Energy intake
- Physical activity
- Sedentary behavior

**Environmental Factors**
- Home
- Child Care
- Schools
- Community
Consequences

Psychosocial Risks:
- Targets of early and systematic social discrimination
- Leading to low self-esteem
- Hinder academic and social functioning,
- Persist into adulthood

Cardiovascular Disease Risks
- Include: high cholesterol levels, high blood pressure, and abnormal glucose tolerance
- In a population-based sample of 5- to 17-year-olds, 70% of obese children had at least one CVD risk factor while 39% of obese children had two or more CVD risk factors

Additional Health Risks
- Other health conditions associated with increased weight include:
  - Asthma
  - Hepatic steatosis
  - Sleep apnea
  - Type 2 diabetes

Consequences
- Dalton III et al found higher physical activity levels and lower levels of screen time to be associated with reports of more positive Health-related quality of life (HRQoL) in southern Appalachia.
- The Pediatric Quality of Life Inventory and questions on physical activity and eating behaviors was administered to 6th grade students in regional schools participating in the Winning with wellness child prevention.

Dalton WT, Schetizina KE, Pfortmiller DT, Slawson DL, Frye WS
Tennessee

- One of the 25 CDC’s Division of Nutrition, Physical Activity, and Obesity (DNPAO) funded states
- Tennessee has received funding for this program since 2008
- TN State Obesity Plan website [www.eatwellplaymoretn.org](http://www.eatwellplaymoretn.org)

2008 Age-Adjusted Estimates of the Percentage of Adults’ Who Are Obese in Tennessee

- ≥ 20 years old

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
<th>Lower 95% Confidence Limit</th>
<th>Upper 95% Confidence Limit</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>29.7</td>
<td>25.2</td>
<td>34.7</td>
<td>2.4</td>
</tr>
<tr>
<td>2004</td>
<td>25.5</td>
<td>21.1</td>
<td>30.4</td>
<td>2.4</td>
</tr>
</tbody>
</table>

2008 Age-Adjusted Estimates of the Percentage of Adults’ Who Are Physically Inactive in Tennessee

- ≥ 20 years old

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
<th>Lower 95% Confidence Limit</th>
<th>Upper 95% Confidence Limit</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
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</tbody>
</table>
### Washington County - Inactivity

- **2008**
  - Percentage: 31.0
  - Lower 95% Confidence Limit: 26.4
  - Upper 95% Confidence Limit: 36.1
  - Standard Deviation: 2.5

- **2004**
  - Percentage: 34.6
  - Lower 95% Confidence Limit: 28.5
  - Upper 95% Confidence Limit: 41.4
  - Standard Deviation: 3.3

### The Burden of Obesity in TN

- The National Immunization Survey shows that Tennessee is **not meeting** any of the five Healthy People 2010 goals for breastfeeding based on children born in 2005.

- 18% of Tennessee youth (9th–12th grades) are **overweight**, and another 17% are **obese**, according to 2007 Youth Risk Behavior Survey data.

### The Burden of Obesity in TN

- 42% of the youth in these grade levels are meeting current **physical activity** recommendation levels.

- Only 18% eat fruits and vegetables five or more times a day.

- Almost **half** drink at least one non-diet soda each day.

- 38% watch three or more hours of television each day.

### Economic Burden

- Obesity also affects the state's economy.

- In Tennessee, the medical costs associated with adult obesity were $1.8 billion in 2003.
What is Tennessee Doing

Prior to receiving CDC funding in 2008:
- Vending legislation passed in 2005
- Expanded funding for the Coordinated School Health program to all public schools
- Obesity research centers
- Partnership with the American Heart Association
- The Tennessee Breastfeeding Coalition which represents five regional coalitions in the state

What is Tennessee Doing

- TN physical activity law: requires K-12 students to receive 90 min./week of physical activity at school
- CSH funding pending approval
- Coordinated School Health (CSH) is an effective approach designed to connect health (physical, emotional and social) with learning
- CSH improves children’s health and their capacity to learn through the support of families, communities and the schools working together

At a Glance

- 41% of TN students are at risk for overweight/obesity
- 5th highest rate of adult obesity (28%)
- 4th highest rate of overweight youth (10-17) at 20%

Healthy Youths: 10 Key Strategies

**Build a Strong Foundation: Strategies 1-4**

1. Address physical activity and nutrition through a Coordinated School Health Program (CSHP),
2. Designate a school health coordinator and maintain an active school health council,
3. Assess the school's health policies and programs and develop a plan for improvements,
4. Strengthen the school’s nutrition and physical activity policies.

**Take Action: Strategies 5-10**

5. Implement a high-quality health promotion program for school staff,
6. Implement a high-quality course of study in health education,
7. Implement a high-quality course of study in physical education,
8. Increase opportunities for students to engage in physical activity,
9. Implement a quality school meals program,
10. Ensure that students have appealing, healthy choices in foods and beverages offered outside of the school meals program.
The Academy strongly encourages you to do the following in your clinical practice.

**Assess:** History
- Family history
- Eating and physical activity
- Patients behaviors

Height and weight gain pattern, socioeconomic, ethnic or cultural beliefs, presence of comorbidities and/or environmental factors.

Beginning at age 2, calculate and plot BMI for all patients on a yearly basis.

**Prevent and Treat:**
- Prevention is for all patients and should include promotion and support for breastfeeding, family meals, limited screen time, regular physical activity and yearly BMI monitoring.

**Prevention Plus** is for children between the 85th - 94th percentiles BMI. Specifically encourage 5 servings of fruits and vegetables/day, 2 hours or less of screen time, 1 hour or more of physical activity and zero sugared drinks.

**My doctor prescribed**
5-2-1-0
**AAP**

- **Structured Weight Management** is used if prevention plus has not been effective and BMI is between 95th - 98th percentiles. This approach combines more frequent follow-up with written diet and exercise plans.

**ETSU ADOLESCENT MEDICINE**

Rx,

Walk for 10 minutes Mon, Wed, Fri or Tues, Thurs, Sat for 1 week, then increase to 20 minutes for another wk, and then to 30 minutes on Mon, Wed, Fri or Tues, Thurs, Sat.

# Review after 3 months.

David O. Chastain, MD

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**AAP**

- **Comprehensive Multidisciplinary Intervention** is used when 3 - 6 months of structured weight management has failed to achieve targets.
- This approach combines more frequent visits with an MD and a dietician and could also include exercise and behavioral specialists.

**AAP: Tertiary Care Intervention**

- For patients with BMI 99th or greater and with associated comorbidities.
- Or for those who structured weight management and comprehensive multidisciplinary intervention were not effective.
Tertiary Care Intervention

- This approach consists of all that is contained in the previous delivered interventions plus consideration of more aggressive therapies including meal replacements, pharmacotherapy, and even bariatric surgery in selected adolescents.

INDICATIONS FOR REFERRAL

- Obesity with comorbidities require rapid weight loss, so referral to pediatric obesity centers
- Pseudotumor cerebri (pediatric neurologist)
- Sleep apnea (pediatric pulmonologist)
- Obesity hypoventilation syndrome (pediatric pulmonologist)
- Slipped capital femoral epiphysis or Blount disease (pediatric orthopedist)

INDICATIONS FOR REFERRAL

- “Massive overweight” or “super obesity”: pediatric obesity specialist
- Refer to a pediatric gastroenterologist or endocrinologist
- Cholelithiasis
- Nonalcoholic fatty liver disease
- Type 2 diabetes
- PCOS
- Mental health specialists: overweight + depression

FAMILY

- Eat 5 fruits and vegetables per day
- Limit screen time to less than 2 hours a day
- Get 1 hour of physical activity a day (does not need to be consecutive)
- Limit consumption of sugar sweetened beverages
- Eat breakfast daily
SIBLING TIME...

FAMILY

- Switch to low-fat dairy products
- Regularly eat family meals together
- Limit fast food, take out, and eating out
- Prepare foods at home as a family
- Eat a diet rich in calcium
- Eat a high fiber diet
- Breastfeed exclusively until 6 months
- Maintenance of breastfeeding after introduction of solid food until 12 months

Resources

- The Maternal and Child Health Library Knowledge Path
  mchlibrary.info/KnowledgePaths/kp_overweight.html
- The American Academy of Pediatrics
  (aap.org/obesity)
- The Centers for Disease Control and Prevention
  (cdc.gov/nccdphp/dnpa/obesity)
- Produce for Better Health Foundation
  (5aday.com)
- The Child Care Nutrition Resource System
  (nal.usda.gov/childcare/)
- Weight Control Information Network
  (win.niddk.nih.gov/index.htm)

References

12. This physical activity recommendation is from the Dietary Guidelines for Americans 2000.
AAP recommends Prevention Plus for which weight status category
A. Healthy Weight
B. Under weight
C. Overweight
D. Obese
E. All the above

In the past three decades, among youths aged 12-19 years, the overweight rate has
A. Quintupled
B. Doubled
C. Decreased
D. Tripled
E. Stable

APPRECIATION!
- Karen Schetzina, MD, MPH
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- Dawn Tuell, MD

THANKS!!!

QUESTIONS AND COMMENTS