Pediatric Metabolic Syndrome

A growing epidemic...

Shannon Russell
Dietetic Intern
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Overview

According to the CDC, obesity has more than tripled in the past 30 years. Obesity can be correlated with the development of several chronic conditions. These include type 2 diabetes, osteoarthritis, hyperlipidemia, hypertension, cardiovascular disease, and different types of cancer. Metabolic Syndrome incorporates risk factors of many of these conditions. It was originally thought to be mostly prevalent in adults, but has been increasing in the pediatric population in recent years.

Pediatric Metabolic Syndrome (PMETs) does not have a clear definition. Most institutions agree that it can be diagnosed when a patient has two or more of the following: insulin resistance and impaired glucose tolerance, elevated cholesterol and triglycerides, low circulating amounts of high-density lipoproteins, obesity (especially around the abdomen), and/or high blood pressure. It is a preventable disease as long as action is taken once risk factors are identified in a child.
Overweight and obesity is strongly associated with the development of **Pediatric Metabolic Syndrome (PMETs)**. The condition of overweight/obesity can cause chronic inflammation in the body. Inflammation causes oxidation reactions. Over time cells become damaged by this oxidation and body functions are impaired, such as reproduction and metabolism (for example, glucose metabolism).

Inappropriate weight gain can be a result of overeating, inadequate or lack of physical activity, and family history. Overweight in a child or teen is diagnosed when they are between the 85th and 95th percentiles of BMI for age. Obesity is diagnosed when they are greater than the 95th percentile. It is very important to maintain a healthy weight and consume a nutritious diet in order to prevent inflammation and oxidation in the body.
Risk Factors

• Obesity
  *High levels of central body fat
  *Progressive weight gain

• Insulin resistance

• Genetics
  *Family history of diabetes, hypertension, early heart disease

• Sedentary lifestyle

• Atherogenic diet
  *Diet high in total fat and saturated fat
Signs and Symptoms

- Abdominal obesity
- Fatigue despite adequate food intake
- Difficulty with exercise
- High blood pressure
- Elevated lipid profile
Identification & Diagnosis

There are several clinical tests than can be run in attempt to properly identify this condition. However, there is no strict standard for diagnosis among children. Several studies have been conducted in order to outline suggestions for determining the presence of PMETs.

- **Hyperglycemia**: blood glucose greater than 100 mg/dL

- **Hypertension**: pre-hypertensive thresholds range from 100-150/55-100
  - [http://www.pediatrichypertension.org/BPLimitsChart0112.pdf](http://www.pediatrichypertension.org/BPLimitsChart0112.pdf) for specific age, weight, and gender guidelines

- **Obesity**: greater than the 95th percentile for BMI for age
  - [http://www.cdc.gov/growthcharts/clinical_charts.htm](http://www.cdc.gov/growthcharts/clinical_charts.htm) for weight percentiles

- **Low HDL cholesterol**: less than 40 mg/dL

- **High LDL cholesterol**: greater than 160-190 mg/dL depending on presence of other risk factors
Treatment

1. **Weight Reduction/Weight Maintenance**
   - Depending on the patient’s age, they should try to lose weight or maintain weight to achieve a healthy BMI. Calorie restriction should not be so strict that growth is stunted (depending on the child’s age and whether they have reached growth potential yet). Appropriate calorie goals can be calculated with the assistance of a dietitian or by using websites such as [www.myplate.gov](http://www.myplate.gov), which also provides tools to track dietary intake and physical activity.

2. **Physical Activity**
   - Children should get 60 minutes of strenuous exercise daily. Find activities that the child enjoys, such as a specific sport or bike riding. This activity should be structured so that the child is exerting themselves for 60 minutes consecutively.
3. Healthy Diet

- A healthy diet should provide all of the food groups, consist of a variety of food items within the individual food groups, and include amounts in moderation. Important points to remember while planning meals are inclusion of antioxidant rich fruits, vegetables, whole grains, fiber, and low fat dairy.
Type 2 diabetes: Hyperglycemia and insulin resistance can develop secondary to prolonged obesity. This condition eventually causes damage to the eyes, circulation, and kidneys.

Osteoarthritis: Chronic inflammation and increased pressure (from overweight) can cause cartilage to break down, especially at the joints. Pain and swelling will occur at the joints and eventually may call for difficult surgeries like joint replacements or increased incidences of fractures.

Atherosclerosis: Chronic high cholesterol levels can cause plaque buildup and hardening of the arteries. This can lead to tissue damage and death. Blockages cause decreased blood flow throughout the body and can increase the incidence of aneurysms.
**Cardiovascular Disease:** Excessive pressure on artery walls caused by high blood pressure can damage blood vessels and organs. Uncontrolled high blood pressure can lead to heart attacks, stroke, aneurysms, chest pain, and heart failure.

**Heart Disease:** Chronic high blood pressure and inflammation can cause damage to heart muscles. This can lead to coronary heart disease (narrowing of the blood vessels) or congestive heart failure (muscles fail to pump blood to the heart).

**Different types of cancer:** Many cancers are associated with obesity. These include breast, colo-rectal, esophageal, endometrial, kidney, pancreatic, gallbladder, and thyroid cancers.
Prevention

Prevention is similar to treatment of this condition

- **Healthy weight** should be maintained throughout childhood and into adulthood.
- **Physical activity** should be part of everyday routines.
- Following a general, **healthful diet** will also contribute to preventing this syndrome.
- **Routine monitoring** of lipid levels, blood pressure, and insulin resistance can be utilized if the child’s family has a strong history of these conditions.
Contest Details

Location: UMHS Cafeteria
(on the wall after registers and near tray drop off)

Prize: Pedometer Watch that you can use to track your walking distance or time different work outs!

How to Enter: Stop by display and fill out an entry form with your name, email address, and phone number
If you or your family member are struggling with this syndrome or would like to learn more about it, the following are a list of other helpful websites and resources available to you:

University of Michigan Nutrition Counseling Center:
**Phone:** 734-936-7527
UH Room # 2A-237
1500 E. Medical Center Drive
Ann Arbor, MI  48109-5056

M-Healthy Nutrition and Weight Management:
[http://www.hr.umich.edu/mhealthy/](http://www.hr.umich.edu/mhealthy/)
734-647-7888

American Academy of Pediatrics:
[www.healthychildren.org](http://www.healthychildren.org)