

Metabolic Syndrome

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Definition

Metabolic syndrome, also known as insulin resistance syndrome, is a group of conditions that include abdominal obesity, insulin resistance, dyslipidemia (elevated triglyceride levels and low high-density lipoprotein cholesterol), and hypertension. People with metabolic syndrome are more likely to develop cardiovascular disease or type 2 diabetes.

Prevalence

In the US, 23.4% of women and 24% of men have metabolic syndrome and the rate has been increasing. It is more common in certain ethnic groups such as African Americans and Mexican Americans.

Risk Factors

- Unhealthy diet, smoking, sedentary lifestyle
- Increased body weight
- Use of certain medications such as Clozapine for mental illness

Diagnosis

The following criteria for metabolic syndrome by the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) is most commonly used. The presence of 3 or more of the below risk factors is an indication that a person has metabolic syndrome.

- 1. Fasting glucose:** ≥ 100 mg/dL (or receiving drug therapy for hyperglycemia).
- 2. Blood pressure:** $\geq 130/85$ mmHg (or receiving drug therapy for hypertension)
- 3. Triglycerides:** ≥ 150 mg/dL (or receiving drug therapy for hypertriglyceridemia).
- 4. High-density lipoprotein cholesterol:** < 40 mg/dL in men or < 50 mg/dL in women (or receiving drug therapy for reduced high-density lipoprotein cholesterol).
- 5. Waist circumference:** ≥ 102 cm (40 in) in men or ≥ 88 cm (35 in) in women; if Asian American, ≥ 90 cm (35 in) in men or ≥ 80 cm (32 in) in women. (The International Diabetes Federation criteria allow the use of a body mass index > 30 kg/m² in lieu of the waist circumference criterion.)

Intervention and Prevention

- **Diet:**

- The Mediterranean diet: High consumption of fruits, vegetables, nuts, whole grains, and olive oil
http://www.heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/Mediterranean-Diet_UCM_306004_Article.jsp#.W66DzS-ZPFQ
- The Dietary Approaches to Stop Hypertension (DASH) diet: Daily sodium intake limited to 2400 mg and higher dairy intake than the Mediterranean diet
<http://www.heart.org/en/health-topics/high-blood-pressure/changes-you-can-make-to-manage-high-blood-pressure/managing-blood-pressure-with-a-heart-healthy-diet>
- Foods with low glycemic index: Whole grains, fruits and vegetables, elimination of sugary beverages
<http://www.diabetes.org/food-and-fitness/food/what-can-i-eat/understanding-carbohydrates/glycemic-index-and-diabetes.html>
- High fiber diet: 30 grams or more of fiber
http://www.heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/Whole-Grains-and-Fiber_UCM_303249_Article.jsp#.W66Evi-ZOgQ

- **Exercise:** Minimum 150 minutes per week of moderate-intensity, or 75 minutes per week of vigorous-intensity aerobic activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity

https://www.cdc.gov/cancer/dcpc/prevention/policies_practices/physical_activity/guidelines.htm

- **Blood lipid level control:**

- Keep the low-density lipoprotein (LDL) cholesterol level at less than 100 mg/dL by diet modification or using a medication such as a statin.
- Increase the high-density lipoprotein (HDL) cholesterol level by exercising, losing weight, and consuming healthy fat foods such as olive oil.

- **Blood pressure control:** Keeping blood pressure under control is important, especially for those with diabetes.
- **Blood sugar control:** Lifestyle modification and blood sugar lowering medications such as Metformin.

Associated Diseases

- Fatty liver and chronic liver disease
- Polycystic ovarian syndrome
- Hypogonadism
- Obstructive sleep apnea
- Microvascular disease

References

Beilby, J. (2004). Definition of Metabolic Syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association Conference on Scientific Issues Related to Definition. *The Clinical Biochemist Reviews*, 25(3), 195–198.

Meigs, J. B. (2017, January 13). The Metabolic Syndrome (Insulin Resistance Syndrome or Syndrome X). Retrieved from <https://www.uptodate.com/contents/the-metabolic-syndrome-insulin-resistance-syndrome-or-syndrome-x>