

## ***EDITORIAL***

# ***METABOLIC SYNDROME***

BY

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Metabolic syndrome is a group of five risk factors that can increase your chance of developing heart disease, diabetes, and stroke. The five risk factors include:

- Increased blood pressure (greater than 130/85).
- High blood sugar levels (insulin resistance).
- Excess fat around the waist.
- High triglyceride levels.
- Low levels of good cholesterol, or HDL.

Having one of these risk factors does not mean that metabolic syndrome occurs. However, one of these risk factors increases the chances of developing cardiovascular diseases. Having three or more of these factors result in a diagnosis of metabolic syndrome and increase the risk of health complications even more.

The American Heart Association (AHA) reports that 35 percent of adults currently have this condition.

The risk factors for metabolic syndrome are related to obesity. The two most important risk factors for developing the condition are defined by the National Heart, Lung and Blood Institute as:

- Central obesity or excess fat around the middle and upper parts of the body.
- Insulin resistance, which makes it difficult for the body to use sugar.

There are other factors that can increase the risk of developing metabolic syndrome. One factor is the age: Less than 10 percent of people in their twenties have the syndrome, but 40 percent of people in their sixties have it. Other risk factors are not getting enough exercise and having other family members with the syndrome. Women who have been diagnosed with polycystic ovary syndrome, a metabolic disorder that affects hormones and the reproductive system, have an increased risk of developing metabolic syndrome.

It is generally accepted that the current food environment contributes to the development of metabolic syndrome. Rather than total adiposity, the core clinical component of the syndrome is visceral and/or ectopic fat (i.e. fat in organs not designed for fat storage) whereas the principal metabolic abnormality is insulin resistance. The continuous provision of energy via dietary carbohydrate, lipid, and protein fuels, unmatched by physical activity/energy demand creates a backlog of the products of

mitochondrial oxidation, a process associated with progressive mitochondrial dysfunction and insulin resistance.

Prolonged chronic stress can contribute to metabolic syndrome by disrupting the hormonal balance of the hypothalamic-pituitary-adrenal axis (HPA-axis). A dysfunctional HPA-axis causes high cortisol levels to circulate, which results in raising glucose and insulin levels, which in turn cause insulin-mediated effects on adipose tissue, ultimately promoting visceral adiposity, insulin resistance, dyslipidemia and hypertension, with direct effects on the bone, causing "low turnover" osteoporosis. HPA-axis dysfunction may explain the reported risk indication of abdominal obesity to cardiovascular disease (CVD), type 2 diabetes and stroke. Psychosocial stress is also linked to heart disease.

Central obesity is a key feature of the syndrome, being both a symptom and a cause of it in that the increasing adiposity often reflected in high waist circumference. Both often results from and often contributes to insulin resistance. However, despite the importance of obesity, patients who are of normal weight may also be insulin-resistant and have the syndrome.

Physical inactivity is a predictor of CVD events and related mortality. Many components of metabolic syndrome are associated with a sedentary lifestyle. These include increased adipose tissue (predominantly central); reduced HDL cholesterol; and a trend toward increased triglycerides, blood pressure, and glucose in the genetically susceptible. Compared with individuals who watched television or videos or used their computers for less than one hour daily, those who carried out these behaviors for greater than four hours daily have a twofold increased risk of metabolic syndrome.

With respect to the demographic, the percentage of women having the syndrome is higher than that of men. The age dependency of the syndrome's prevalence is seen in most populations around the world.

The metabolic syndrome quintuples the risk of type 2 diabetes mellitus. Type 2 diabetes is considered a complication of metabolic syndrome. In people with impaired glucose tolerance or impaired fasting glucose, presence of metabolic syndrome doubles the risk of developing type 2 diabetes. It is likely that prediabetes and metabolic syndrome denote the same disorder, defining it by the different sets of biological markers. The presence of metabolic syndrome is associated with a higher prevalence of CVD than found in patients with type 2 diabetes. Hypo-adiponectinemia has been shown to increase insulin resistance, and is considered to be a risk factor for developing metabolic syndrome.

The approximate prevalence of the metabolic syndrome in patients with coronary heart disease (CHD) is 50%, with a prevalence of 37% in patients with premature coronary artery disease (age 45), particularly in women. With appropriate cardiac rehabilitation and changes in lifestyle (e.g. nutrition, physical activity, weight reduction, and, in some cases, drugs), the prevalence of the syndrome can be reduced.

Lipodystrophic disorders in general are associated with metabolic syndrome. Both genetic and acquired forms of lipodystrophy may give rise to severe insulin resistance and many of metabolic syndrome's components.

People with schizophrenia, schizoaffective disorder or bipolar disorder may have a predisposition to metabolic syndrome that is exacerbated by sedentary lifestyle, poor dietary habits, possible limited access to care, and antipsychotic drug-induced adverse effects.

To diagnose metabolic syndrome, several different tests are needed: measurement of waist circumference

- Fasting blood triglycerides.
- Cholesterol levels.
- Blood pressure.
- Fasting glucose level.

Abnormalities noted on three or more of these tests indicate the presence of metabolic syndrome.

The complications that may result from metabolic syndrome are frequently serious and long-term (chronic). They include:

- Hardening of the arteries (atherosclerosis).
- Diabetes.
- Heart attack.
- Kidney disease.
- Stroke.
- Nonalcoholic fatty liver disease.
- Peripheral artery disease.
- Cardiovascular disease.

If diabetes develops, this can place the risk for the development of additional health complications including:

- Eye damage (retinopathy).
- Nerve damage (neuropathy).
- Kidney disease.
- Amputation of limbs.

The goal of treatment of metabolic syndrome is to reduce the risk of developing further health complications. Lifestyle changes include losing between seven and 10 percent of the current weight and getting at least 30 minutes of moderate to intense exercise five to seven days a week. The patient is advised to quit smoking.

Medications are prescribed to reduce blood pressure, cholesterol, and/or blood sugar. Low-dose aspirin is prescribed to help reduce the risk of stroke and heart attack.

Preventing metabolic syndrome is certainly possible. Maintaining a healthy waist circumference, healthy blood pressure levels, and healthy cholesterol levels reduce the risk for metabolic syndrome. Exercise and weight loss can aid in these efforts and help reduce the risk of insulin resistance.

#### Metabolic Syndrome Diet

#### **Foods that Make Metabolic Syndrome Worse**

1. **Fake and processed foods** should be avoided as much as possible. These frozen, bagged and boxed items are typically devoid of nutrients and loaded with unhealthy additives and preservatives that do nothing good for health.
2. **Artificial sweeteners** have been directly linked with the occurrence of diabetes and metabolic syndrome. Accumulating evidence suggests that frequent consumers of sugar substitutes containing aspartame, sucralose and saccharin may also be at an increased risk of excessive weight gain as well as development of metabolic syndrome, type 2 diabetes and cardiovascular diseases.
3. **Diet sodas** contain artificial sweeteners as well as other unhealthy ingredients, so they are considered lethal soft drinks. The consumption of diet soda is associated with significantly greater risks of select incident metabolic syndrome components and type 2 diabetes.
4. **Trans Fats (Trans Fatty Acids)** are found in foods made with hydrogenated oils and fats, such as margarine; baked goods like cookies, cakes and pies; crackers; frostings; and coffee creamers. They raise LDL cholesterol and triglyceride levels, which is bad news for your waistline, heart health and metabolic disorders.
5. **Consumption of refined carbohydrates and sugar** come to high blood sugar levels, insulin resistance, and the development of diabetes and metabolic syndrome.
6. **Alcohol** adds extra calories to diet, which can cause weight gain.

#### ***Foods that Heal***

Some of the top foods to heal and prevent metabolic syndrome include:

1. **Fish and Omega-3 Foods:** Omega-3 found in wild-caught, cold-water fish have been found to help regulate heartbeat, reduce blood pressure, decrease blood clot formation and reduce overall inflammation, all of which decrease the risk for heart attacks and strokes. Omega-3 foods are also cholesterol-lowering foods that help reduce triglycerides and LDL cholesterol. Other omega-3 foods include walnuts, flaxseeds, and grass-fed beef.
2. **Vegetables:**
  - Dark leafy greens like spinach, avocado, broccoli, cabbage, and carrots are loaded with disease-fighting and anti-inflammatory antioxidants and phytonutrients.

- Eating avocados in particular has been found to be clinically associated with lower metabolic syndrome. Think of a rainbow as you make your daily vegetable choices (red bell peppers to pumpkin to yellow squash to arugula to purple eggplant). This way, not only keeping meals interesting, and obtaining all of the great vitamins.
3. **Fruits:** Similar to vegetables, there are so many options that not only taste good, as apples, bananas, oranges, or pears. Pomegranate and pomegranate seeds in particular have been shown to help ameliorate metabolic syndrome. Pomegranate exerts hypoglycemic effects, including increased insulin sensitivity, inhibition of  $\alpha$ -glucosidase, and impact on glucose transporter type 4 function, but is also responsible for a reduction of total cholesterol, and the improvement of blood lipid profiles, as well as anti-inflammatory effects through the modulation of peroxisome proliferator-activated receptor pathways. These effects may also explain how pomegranate-derived compounds function in the amelioration of adverse health effects caused by metabolic syndrome.
  4. **Legumes:** Some delicious and tasty legumes to try include kidney beans, lentils, chickpeas, black-eyed peas and lima beans. Rich in fiber and protein, legumes are an excellent daily choice for keeping blood sugar stable and your waistline trim. They are particularly useful in preventing metabolic syndrome.
  5. **Whole Grains:**
    - High-fiber foods, like whole grains including oatmeal and brown rice, not only have proven benefits for diabetes and heart health, but they also help keep waistline in check. Whole grains are parts of a balanced, healthy metabolic syndrome diet treatment plan. Ginseng, berberine and bitter melon, are commonly used in Chinese medicine. They help regulate glucose and lipid metabolism, which directly and positively affect weight management.
  6. **Grapefruit** is not only a delicious way to help lose excess weight, it also appears to be a diabetic's (or potential diabetic's) best friend.
  7. **Cinnamon** can reduce fasting glucose levels anywhere from 18 to 29 percent in type 2 diabetics. Interestingly, cinnamon maintains its positive effects on blood sugar for at least 12 hours.

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