



THE METABOLIC SYNDROME

This answer is brought to you by many of the Australian nutrition professionals who regularly contribute to the Nutritionists Network ('Nut-Net'), a nutrition email discussion group.

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The following questions and answers address a medical condition known as the 'metabolic syndrome', or 'syndrome X'. Although both names are synonymous and widely used, for the sake of consistency only the term 'metabolic syndrome' will be used in this FAQ.

What does 'metabolic syndrome' mean?

Metabolic syndrome is a condition in which a group of risk factors for cardiovascular disease (heart disease and stroke) and type 2 diabetes occur together. Although it doesn't have a universally accepted definition, most health professionals would include the following as the principal components. Abdominal obesity (i.e. excess body fat in the region of the stomach); High blood pressure (also known as 'hypertension'); Low blood levels of the 'good' cholesterol, HDL; High blood levels of the 'bad' cholesterol, LDL; High blood levels of triglycerides; and insulin resistance (that is, an impaired ability of the body's insulin to handle blood glucose).

The criteria for each component used for diagnosis of metabolic syndrome are outlined in [Appendix A](#). People with three or more of the above symptoms can be considered to have the metabolic syndrome, and demonstrate a greatly increased risk of developing cardiovascular disease and/or type 2 diabetes, two of the most pervasive diseases in Western populations.

How common is the metabolic syndrome?

Although the exact prevalence of metabolic syndrome is unknown, the condition is widespread among the adult population in developed nations, and frequency increases with age. For example, a study in the United States found that about 7% of adults aged 20-29 years suffered from metabolic syndrome, whilst 43% of those in the age group 60-69 years were affected. Nearly half of the adults aged 60-69 had the syndrome. This study was based on results obtained during the period 1988-1994, when obesity rates were lower than at present. The frequency of metabolic syndrome among American (and also Australian) adults is almost certainly greater now than it was at the time of that study.

Metabolic syndrome is now also prevalent among affluent adults who have adopted Western diets and lifestyles in developing nations. Unfortunately it isn't only adults

who are affected – the condition is also afflicting an increasing number of children and adolescents as the worldwide epidemic of obesity spreads across the age groups. A recent US study found that 20-25% of obese children and adolescents were also insulin resistant. Insulin resistance is a key element of metabolic syndrome and a condition that can lead to type 2 diabetes.

What are the health implications of having metabolic syndrome?

Each component of metabolic syndrome significantly increases the risk of developing one or more diseases. For example, excess abdominal fat is associated with increased risk of type 2 diabetes and heart disease; hypertension is the most important risk factor for stroke; high blood LDL and low HDL levels increase the risk of developing heart disease; and insulin resistance is an initial step on the path to type 2 diabetes. In brief, having type 2 diabetes significantly increases the risk of developing heart disease, kidney disease and blindness, and increases the chance of limb amputation (due to gangrene).

The rapid increase in incidence of metabolic syndrome, not only among adults but also in children and adolescents, represents a potential 'time bomb' for the future adult populations of developed nations. Effective preventive measures are needed for the entire population, and strategies to reduce the incidence of metabolic syndrome among adults (mainly) are urgently required.

What can be done to reduce my risk of developing metabolic syndrome, or to help overcome the syndrome if I already have it?

First and foremost, if you are undergoing treatment for any of the components of metabolic syndrome (or for the actual diseases associated with it, such as diabetes or heart disease) it is essential that you follow the advice of your professional health carer(s). Your doctor and/or dietitian know your particular circumstances and can prescribe treatment that is tailored to best meet your requirements. The advice provided in the remainder of this FAQ is of a general nature only.

Although the incidence of metabolic syndrome is increasing, the situation is far from hopeless. Metabolic syndrome is a reasonably recent phenomenon and its causes, although not entirely understood, include various environmental factors. More specifically, changes in the environment that promote obesity, hypertension, insulin resistance and so on have occurred recently, resulting in an increase in frequency of metabolic syndrome.

Examples of environmental changes that may have contributed to the metabolic syndrome include a marked reduction (by most people) in physical activity, and an increase in the number of meals eaten away from home (particularly foods that are rich in saturated fat and salt). If the environment can be altered in a direction that promotes obesity and metabolic disorders, reversing negative changes in the environment represents a strategy for overcoming metabolic syndrome.

Steps you can take to reduce the risk (or severity) of metabolic syndrome include:

(i) Increase activity levels

The 'diabetes epidemic' that is sweeping the Western world, and is increasingly affecting affluent groups in developing nations parallels the obesity epidemic that began a decade or so earlier. Although obesity is the single most important risk factor for type 2 diabetes, normal weight individuals are not guaranteed protection against diabetes. Some slim people also develop insulin resistance, and a small proportion of such people will progress to diabetes. Physical activity can assist in reducing the risk (or severity) of metabolic syndrome, independently of any effect on body weight. This means that even if you are having trouble losing weight, increasing physical Activity levels will help to reduce your risk of developing heart disease or type 2 diabetes. This is the cornerstone of the 'health at any size' movement. You don't need to be extremely (or even very) active to gain substantial benefit. By taking part in just 30 minutes of moderately-vigorous activity (such as brisk walking, cycling, swimming, light weight-training and so on) daily, you can substantially reduce your risk (or severity) of metabolic syndrome.

(ii) Improve health through better eating habits

In brief, a diet that counters metabolic syndrome should be based on the Dietary Guidelines for Australians (see [Appendix C](#) for details of the most relevant guidelines). In addition to the advice given in the dietary guidelines, emphasis should be placed on eating foods with relatively low 'glycaemic index' (GI). It is also important to eat only sparingly foods that are high in saturated fats (such as full-fat dairy products, fatty meats, biscuits, cakes, pastries, potato chips and most other fried takeaway foods). Suitable replacements are whole-grain cereal foods, fruits and vegetables and foods rich in monounsaturated and polyunsaturated fats, including those that provide high levels of 'omega-3' fats. Fish (especially dark-fleshed fish) is an excellent source of omega-3 fats. It is now usually recommended that we eat two or three fish meals (preferably not fried or battered) per week. Green leafy vegetables are also a good source of omega-3 fats. Other good sources of health-promoting fats include avocado, nuts, seeds (pumpkin, sunflower), canola oil, olive oil, sunflower oil, soybean oil, peanut oil, and margarine spreads.

The increased risk of stroke and heart disease from high blood pressure means that careful attention should be paid to the dietary guideline on salt (sodium chloride): 'Choose foods low in salt'. Low salt foods are defined in the food regulations as having a sodium content that does not exceed 120 mg/100 g. The requirement (as of 31 December 2002) to include sodium content on a 'nutrition information panel' on product labels means that reading the labels on supermarket foods will help you to identify those processed foods that are 'low salt'.

The dietary guideline on alcohol (see [Appendix C](#)) recommends that alcohol intake be 'limited'. The National Health and Medical Research Council has published guidelines on safe levels of alcohol consumption. These guidelines indicate a safety range of zero to two standard drinks per day for women, and zero to four standard drinks per day for men. A 'standard drink' is one that contains about 10 g of alcohol. Examples are 285 mL of full strength beer (a 'pot' or 'middy'); 375 mL of reduced-alcohol beer; 30 mL (a 'nip') of spirit or liqueur; 60 mL of fortified wine such as port or Muscat; and 120 mL (a small glass) of Australian table wine.

(iii) Lose some weight (if overweight or obese--see Appendix B for a guide on whether or not you may need to lose weight)

Weight loss should result from increasing physical activity and making appropriate alterations to the diet, as recommended above. Weight loss has beneficial effects on several components of metabolic syndrome, including decreasing the risk of developing insulin resistance. Although only a relatively small percentage of those with insulin resistance progress to type 2 diabetes, all people that do develop type 2 diabetes experience insulin resistance first. Insulin resistance is therefore indicative of diabetes risk. Because the chance of developing insulin resistance increases with body fat level, weight reduction should lower the risk of insulin resistance. It has been reported that carrying as little as 11 kg of excess body fat during early adulthood increases the risk of later onset of type 2 diabetes twenty-fold.

If you have recently gained a significant amount of weight, in addition to attempting to regain normal weight with diet and physical activity, it is advised that you ask your doctor to test you for insulin resistance. You might also like to ask if your doctor believes that a 'glucose tolerance test' that measures both 'glucose response' and 'insulin response' is appropriate. A reduction in body fat almost invariably leads to improved blood pressure. Losing weight therefore reduces the risk of stroke, because high blood pressure is the strongest individual risk factor for stroke.

Maintaining weight in the 'healthy weight range' (see [Appendix C](#)) is ideal, though not essential for significant health benefits. Losing about 5-10% of your current weight (if you have substantial excess body fat) will have beneficial effects on several aspects of metabolic syndrome. Although 5-10% may not seem a lot, it can actually be quite a high percentage of your initial body fat level. For example, if you weigh 75 kg and have a body fat level of 33% (indicative of mild obesity), your body fat content is ~25 kg. Losing 10% (7.5 kg) of your body weight as fat means that you have lost about 30% of your body fat.

(iv) Quit smoking (if you are a smoker)

Smoking is associated with increased risk of heart disease (in addition to other conditions not directly related to metabolic syndrome, including lung cancer, bronchitis, emphysema and impotence). Quitting smoking is one of the healthiest lifestyle alterations that can be made by a person who smokes.

(v) Reduce stress levels

Although not necessarily a direct cause of metabolic syndrome, increasingly busy lifestyles and other sources of stress have a profound influence on health outcome. Light physical activity, meditation, yoga, music and/or other relaxation techniques can all be used to reduce stress levels.

(vi) Take any medications prescribed by your doctor

These may be to: assist with control of blood pressure; improve levels of blood cholesterol and triglycerides; aid appetite control and body fat reduction; aid smoking cessation; and/or help with stress management.

Appendix A: Criteria for Metabolic Syndrome (with all blood levels in the fasting state)

For metabolic syndrome to be diagnosed, at least three of the following apply concurrently:

- Waist circumference > 102 cm (men); 88 cm (women)
- Serum triglycerides \geq 1.69 mmol/L
- HDL cholesterol < 1.04 mmol/L (men); 1.29 mmol/L (women)
- Blood pressure \geq 130/85 mm Hg
- Serum glucose \geq 6.1 mmol/L.

Appendix B. Weight Categories and Determination of Body Fatness

Weight for height is calculated according to the 'body mass index' (BMI). BMI is calculated as weight (in kilograms) divided by height-squared, where height is measured in metres. For example, large man (e.g. an AFL ruckman or rugby forward) might be 2.00 m tall and weigh 100 kg. His BMI is then $(100/2^2) = 25.0$

The following categories are used to define weight status:

- BMI below 18.5 is defined as 'underweight'
- BMI between 18.5 and 24.9 is defined as within the 'normal weight' or 'healthy weight' range
- BMI of 25.0 - 29.9 is defined as 'overweight'
- BMI of 30.0 and above is defined as 'obese'

Fat in the abdomen is more strongly associated with adverse health outcomes than fat deposited elsewhere in the body. BMI alone is not necessarily a good predictor of total body fat level, or of your level of abdominal fat. Therefore, you need to take into account waist circumference as well as BMI to determine how 'healthy' you are with respect to total fat and body fat distribution. To measure waist circumference, pass a tape measure horizontally around your waist at the level of the navel, breathe out, and measure the circumference before you breathe in again. A waist circumference greater than about 102 cm (men) or 88 cm (women) indicates excessive abdominal fat.

There may also be differences between people of different origins with respect to appropriate BMI and waistline circumferences. For example, for the same BMI and waist circumference, Australian Aborigines, people of Asian origin and South Pacific islanders appear to be at higher risk of developing metabolic syndrome than people of European origin.

Appendix C. Australian Dietary Guidelines relevant to the prevention and treatment of metabolic syndrome

- Maintain a healthy body weight by balancing physical activity and food intake
- Eat a diet low in fat and, in particular, low in saturated fat
- Choose low salt foods and use salt sparingly
- Eat plenty of breads and cereals (preferably wholegrain), vegetables (including legumes) and fruits
- If you drink alcohol, limit your intake
- Eat only a moderate amount of sugars and food containing added sugars.

Disclaimer: This material is provided on the basis that it constitutes advice of a general nature only. It is not intended to replace the advice of a physician or a dietitian.