Non-Communicable Diseases Watch

February 2024

Prevention and Control of Metabolic Syndrome

Key Messages

※ Metabolic syndrome is a cluster of conditions that occur together, increasing the risk of heart disease, stroke and type 2 diabetes. These conditions include central obesity, elevated blood pressure, elevated blood glucose and abnormal cholesterol or triglyceride levels.

※ While some people are genetically prone to developing metabolic syndrome (such as those having a family history of diabetes or high blood cholesterol), lifestyle is a well-known factor that plays a major role in increasing or decreasing the risk of metabolic syndrome.

※ The Population Health Survey 2020-22 observed that the prevalence of different components of metabolic syndrome among persons aged 15–84 ranged from 8.5% (raised blood glucose/diabetes) to 51.9% (raised blood cholesterol/hypercholesterolaemia).

※ To reduce the risk of developing metabolic syndrome, members of the public are urged to lead a healthy lifestyle that includes eating a balanced diet, getting more physical activity and reducing sedentary behaviours, no smoking and refrain from alcohol drinking.

※ Members of the public are also urged to regularly check for “3Hs” (i.e. high blood pressure, high blood glucose and high blood lipids) for early detection and intervention if indicated. Members of the public can consult family doctors about the said screenings.

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Prevention and Control of Metabolic Syndrome

Metabolic syndrome is a cluster of conditions that occur together, increasing the risk of heart disease, stroke and type 2 diabetes. These conditions include excess body fat around the waist (i.e. central obesity), elevated blood pressure, elevated blood glucose and abnormal cholesterol or triglyceride levels. While most of these conditions associated with metabolic syndrome do not have obvious signs or symptoms, one sign that is visible is a large waist circumference or 'apple-shape' body with excessive accumulation of fat inside the abdominal cavity[1]. Compared with individuals without metabolic syndrome, those with metabolic syndrome are 2 times more likely to develop cardiovascular diseases including myocardial infarction and stroke[2] and 5 times more likely to develop type 2 diabetes[3]. Besides, metabolic syndrome is also associated with increased risks of certain cancers[4], including 36% increased risk of colorectal cancer[5], 37% increased risk of pancreatic cancer[6], 81% increased risk of liver cancer[7], as well as 2-fold increased risk of post-menopausal breast cancer[8]. Overall, individuals with metabolic syndrome would have a 46% increased risk of all-cause mortality compared to those without the syndrome[9].

Global Prevalence of Metabolic Syndrome

Over the years, various clinical definitions or diagnostic criteria of metabolic syndrome according to sex, ethnicity, and other factors have been proposed by different professional organisations[10, 11]. Nevertheless, a meta-analysis of global data from 28 million individuals reported that the global prevalence of metabolic syndrome in the general adult population varied from 12.5% to 31.4% according to the definition or diagnostic criteria considered in the studies[12]. In 2020, another study estimated that 2.8% of children (6–12 years) and 4.8% adolescents (13–18 years) worldwide had metabolic syndrome[13]. In Mainland China, a meta-analysis of studies involving over 226 000 persons aged 15 years and older reported that the pooled prevalence of metabolic syndrome was 24.5%[14].

Association between Lifestyle and Metabolic Syndrome Risk

While some people are genetically prone to developing metabolic syndrome (such as those having a family history of diabetes or high blood cholesterol)[2], lifestyle is a well-known factor that plays a major role in increasing or decreasing the risk of metabolic syndrome (Box 1)[15, 16].

Box 1: Lifestyle factors associated with metabolic syndrome

Eating habits — Poor eating habits (such as excessive intake of ultra-processed foods with high energy density, added sugar and low amounts of dietary fibre[17]; processed meat and red meat which are usually high in salt and saturated fat[18, 19]) could increase the risk of metabolic syndrome development. In contrast, optimal consumption of fruit and vegetables is protective against metabolic syndrome[20]. Studies showed adherence to the "High meat/Western" dietary patterns (characterised by high intake of red meat, processed meat, refined grains, sugar-sweetened beverages, sweets, etc.) was associated with a 19% increased risk of metabolic syndrome, while adherence to the "Healthy" dietary patterns (characterised by the high intake of fruit, vegetables, legumes, whole-grains, poultry, fish, nuts, low-fat dairy, etc.) would reduce the risk by 15%[21].

Physical Activity Participation — A sedentary lifestyle is detrimental to metabolic health[22]. Independent of physical activity, studies showed that intermediate level of sedentary behaviour (with a median sitting duration of 4 hours per day) conferred a 17% increase in risk for metabolic syndrome and high level of sedentary behaviour (with a median sitting duration of more than 7 hours per day) would increase the risk by 71%[23]. Conversely, regular participation in physical activity can help reduce visceral fat (i.e. the fat accumulated within the abdominal cavity or around internal organs), lower blood pressure, control blood glucose levels and improved blood lipid profiles (including raising the levels of high-density lipoprotein cholesterol and lowering the levels of triglycerides)[16, 24]. Studies showed that people with leisure-time physical activity volume equal to 150 minutes of moderate-intensity physical activity per week would have a 10% reduced risk of metabolic syndrome compared to physically inactive people[25].

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Box 1: Lifestyle factors associated with metabolic syndrome (continued)

Alcohol Consumption — Alcohol is a toxic substance with direct and indirect effects on various body organs and systems. In the context of metabolic syndrome, alcohol drinking increases blood pressure, raises the levels of triglycerides, and possibly impairs insulin sensitivity[16]. A study analysed drinking habits of over 26 million Koreans aged 20 and above and observed that men who consumed 7.1–14.0 grams per day (g/d) and 14.1–28.0 g/d of alcohol would have 9% and 25% increased risk of metabolic syndrome respectively compared with non-drinking men. Similarly, women who consumed 14.1–28.0 g/d would have a 7% increased risk of metabolic syndrome compared to non-drinking women[26].

Smoking — Smoking is known to increase blood pressure, augment insulin resistance and affect lipid metabolisms in the body[16, 27]. Compared with nonsmokers, active smokers would have a 26% increased risk of metabolic syndrome. As for heavy smokers (with 20 or more cigarettes a day), the relative risk would increase to 42%[27].

Prevalence of Different Metabolic Disorders among Local Population

The Department of Health (DH) of the Hong Kong Special Administrative Region (SAR) Government conducted the Population Health Survey 2020-22 which interviewed more than 16 000 non-institutionalised persons aged 15 and above and over 2 000 respondents aged 15–84 further completed the heath examination (including physical measurement and blood taking for biochemical testing). As shown in Table 1, the prevalence of different components of metabolic syndrome among persons aged 15–84 ranged from 8.5% (raised blood glucose/diabetes) to 51.9% (raised blood cholesterol/hyper-cholesterolaemia)[28].

Central Obesity — 37.8% (36.8% for males; 38.7% for females) of persons aged 15–84 had central obesity as defined by waist circumference. The prevalence increased with age from 15.7% among persons aged 15–24 to 49.2% among persons aged 65–84[28].

Raised blood pressure/hypertension — 29.5% (33.2% for males; 26.2% for females) of persons aged 15–84 had hypertension or raised blood pressure by physical measurement. The prevalence increased with age from 4.9% among persons aged 15–24 to 57.4% among persons aged 65–84[28].

Raised blood glucose/diabetes — 8.5% (11.1% for males; 6.1% for females) of persons aged 15–84 had diabetes or raised blood glucose or glycated haemoglobin (HbA1c) by biochemical testing. The prevalence increased with age from 0.6% among persons aged 15–24 to 19.0% among persons aged 65–84[28].

Raised blood cholesterol/hypercholesterolaemia — 51.9% (52.9% for males; 51.0% for females) of persons aged 15–84 had hypercholesterolaemia or raised blood cholesterol by biochemical testing. The highest prevalence was observed in the age group 55–64 (72.1%)[28].

Raised triglyceride — 18.6% (22.2% for males; 15.3% for females) of persons aged 15–84 had raised triglyceride by biochemical testing. The prevalence increased with age from 3.9% among persons aged 15–24 to 23.5% for those aged 55–64 and then decreased to 21.5% among those aged 65–84[28].

Table 1: Prevalence of different metabolic conditions among non-institutionalised persons aged 15–84

Metabolic condition	Prevalence
Central obesity[+]	37.8%
Raised blood pressure / hypertension[^]	29.5%
Raised blood glucose / diabetes[§]	8.5%
Raised blood cholesterol / hypercholesterolaemia[#]	51.9%
Raised triglycerides[£]	18.6%

Base: All respondents aged 15–84 who had participated in the health examination.
Notes: [+]Waist circumference greater than or equal to 90 cm for males and greater than or equal to 80 cm for females. [^]Including self-reported doctor-diagnosed hypertension and no self-reported history of hypertension but raised blood pressure by physical measurement with systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg. [§]Including self-reported doctor-diagnosed diabetes and no self-reported history of diabetes but raised blood glucose or HbA1c by biochemical testing with fasting glucose greater than or equal to 7.0 mmol/L or HbA1c greater than or equal to 6.5%. [#]Including self-reported doctor-diagnosed high blood cholesterol and no self-reported history of raised blood cholesterol but raised blood cholesterol by biochemical testing with total cholesterol greater than or equal to 5.2 mmol/L. [£]Triglyceride greater than or equal to 1.7 mmol/L.
Source: Population Health Survey 2020-22.

Reducing the Risk of Metabolic Syndrome

Like most chronic non-communicable diseases, metabolic syndrome is largely the consequences of an "unhealthy" lifestyle. Thus, the most promising preventive measure is leading a healthy lifestyle. This includes eating a balanced diet, getting more physical activity and reducing sedentary behaviours, no smoking and refrain from alcohol drinking. Besides, members of the public are urged to regularly check for "3Hs" (i.e. high blood pressure, high blood glucose and high blood lipids) for early detection and intervention if indicated (Box 2). Members of the public can consult family doctors about the said screenings.

The SAR Government is committed to fighting against non-communicable diseases including metabolic syndrome in all fronts and alleviating its burden. The DH will continue organising health promotional campaigns using a variety of strategies to increase people's health literacy and enhance public awareness about the importance of healthy living in the prevention of metabolic syndrome, as well as working in close partnership with other government departments and community partners to foster a health-enhancing environment.

Box 2: Recommendations about checking for high blood pressure, high blood glucose and high blood lipids for general adult population

- Adults aged 18 or above are recommended to have blood pressure checked at least once every 2 years, and annual screening is recommended for older adults[29];
- Adults aged 45 or above are recommended to have blood glucose checked at a minimum of 3-year intervals, and more frequent testing (e.g. every 12 months) is recommended when risk factors (such as overweight, obesity, family history of diabetes, etc.) are present[30];
- Adults aged 50–75 are recommended to screen for hyperlipidaemia every 3 years; more frequent testing (e.g. every 12 months) is recommended when risk factors of cardiovascular diseases (such as smoking, obesity, hypertension, diabetes, etc.) are present[31].

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World Obesity Day is observed annually on the fourth of March. Convened by the World Obesity Federation in collaboration with its global members, it calls for a cohesive, cross-sector response to the obesity crisis.

The theme for 2024 is "**Let's Talk About Obesity and …**". For more details about the theme and World Obesity Day campaigns, please visit the thematic website at www.worldobesityday.org/.

Non-Communicable Diseases (NCD) WATCH is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.