Non-Communicable Diseases Watch

October 2023

衞生防護中心 Centre for Health Protection

衞生署 Department of Health

Cholesterol and Ischaemic Stroke Risk

Key Messages

※ Excess cholesterol in the blood (hypercholesterolaemia) would increase the risk of developing potentially lethal diseases, including ischaemic stroke.

※ According to the Population Health Survey 2020-22, the overall prevalence of raised blood cholesterol or hypercholesterolaemia among persons aged 15–84 was 51.9%. While hypercholesterolaemia has no signs or symptoms in most cases, the survey observed that up to 70% of persons with raised blood cholesterol or hypercholesterolaemia were unaware of their condition but detected by biochemical testing during health examination provided under the survey.

※ For prevention of hypercholesterolaemia and reduce the risk of ischaemic stroke, members of the public are encouraged to lead a healthy lifestyle that includes eating a balance diet with reducing salt intake and limiting consumption of foods high in saturated fat and trans fat; being physically active and limiting the amount of time spend being sedentary; no smoking; and refrain from alcohol drinking.

※ For those at higher risk of hypercholesterolaemia (such as older adults aged 50–75), regular monitoring of their lipid profiles would help inform decisions about disease prevention strategies (such as lifestyle modifications). Members of the public can consult doctors about screening for high blood lipids.

※ The Department of Health will continue to monitor the health status of local population, organise health promotional campaigns to increase people's heath literacy in disease prevention, as well as work in close partnership with various stakeholders to foster a health-enhancing environment.

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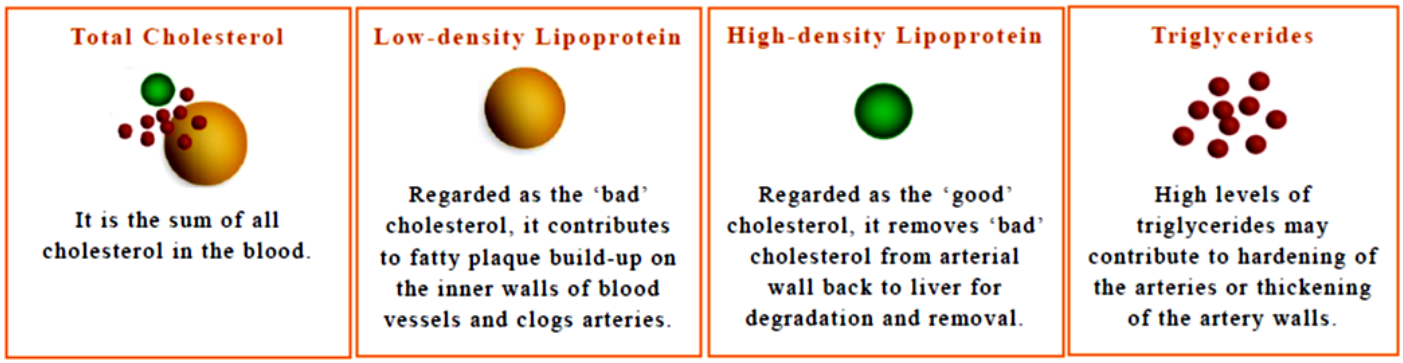
Cholesterol and Ischaemic Stroke Risk

Cholesterol is a waxy, fat-like substance (lipid) that the body needs for maintaining the integrity of cell membrane and producing certain hormones (such as testosterone and estrogen), vitamin D as well as fat-dissolving bile acids[1]. While the liver would manufacture enough cholesterol to support body's needs, eating too much food high in saturated fat or trans fat (such as processed meat, pastries, palm oil, coconut oil, lard, butter and full-fat dairy products) will increase the amount of cholesterol in the blood. Excess cholesterol in the blood (hypercholesterolaemia) would increase the risk of developing potentially lethal diseases, such as coronary heart disease and stroke. This article briefly discusses the major types of cholesterol, reviews the association of blood lipid disorders and ischaemic stroke, depicts the blood lipid profiles among local population, and suggests ways to keep blood cholesterol in checks.

Major Types of Cholesterol

There are the two main types of cholesterol: low-density lipoprotein (commonly known as 'bad' cholesterol) and high-density lipoprotein (commonly known as 'good' cholesterol). Along with triglycerides (another type of lipid), total cholesterol, low-density lipoprotein and high-density lipoprotein are the types of blood lipids usually included in lipid profile (Figure 1)[1, 2]. Depending on the type of blood lipids involved, individuals with blood lipid disorders may have high levels of total cholesterol, high levels of low-density lipoprotein, low levels of high-density lipoprotein, high levels of triglycerides, even a combination of these suboptimal blood lipid conditions.

Figure 1: Major types of cholesterol



Association of Blood Lipid Disorders and Ischaemic Stroke Risk

Ischaemic stroke is the most common type of stroke, accounting for 62% of global incident cases of stroke in 2019[3]. It happens when the blood supply to part of the brain is cut off by a plaque or blood clot, leading to the death of brain cells. A number of factors can increase of the risk of ischaemic stroke. Some of the risk factors are non-modifiable (such as advancing age and family history of stroke), but most are preventable or modifiable. An international study (INTERSTROKE) identified 10 potentially modifiable risk factors (including smoking, alcohol consumption, physical inactivity, unhealthy eating habits, abdominal obesity, hypertension, blood lipid disorders, diabetes, cardiac causes and psychosocial factors) and appraised the percentage of strokes attributed to them. Results showed that 34% of ischaemic strokes could be attributed to blood lipid disorders[4].

By promoting atherosclerosis and thrombosis or increasing blood viscosity[5], epidemiology studies showed that high levels of total cholesterol, high levels of low-density lipoprotein or high levels of triglycerides would increase the risk of ischemic stroke[5-7]. Conversely, higher levels of high-density lipoprotein might reduce ischaemia stroke risk[6,7]. A prospective cohort study in China with 267 500 participants aged 20 years or above observed that per-unit increase (1 millimole per liter [1mmol/L]) increase of total cholesterol, low-density lipoprotein and triglycerides was associated with 8%, 8% and 7% increased risk for ischaemic stroke, respectively. For high-density lipoprotein, per-unit increase would reduce ischaemic stroke risk by 16%[8].

Blood Lipid Profiles among Local Population

The Department of Health (DH) conducted regular territory-wide surveys to collect pertinent information on the patterns of health status and health-related issues among the general population in Hong Kong Special Administrative Region (SAR), including biochemical testing for blood concentrations of total cholesterol, low-density lipoprotein, high-density lipoprotein and triglycerides. Among non-institutionalised persons aged 15–84, the Population Health Survey 2020-22[9] observed that 42.4% of them had total cholesterol concentrations higher than or equal to 5.2 mmol/L, 30.0% had low-density lipoprotein concentrations higher than or equal to 3.4 mmol/L, 15.8% had high-density lipoprotein concentrations lower than 1.0 mmol/L for males or lower than 1.3 mmol/L for females, and 18.6% had triglyceride concentrations higher than or equal to 1.7 mmol/L.

Overall, the prevalence of raised blood cholesterol or hypercholesterolaemia (including self-reported doctor-diagnosed hypercholesterolaemia and no self-reported history but raised blood cholesterol by biochemical testing) among persons aged 15–84 was 51.9%. Analysed by gender and age group, the prevalence of raised blood cholesterol or hypercholesterolaemia was higher among males (52.9%) and people aged 55–64 (72.1%). More importantly, up to 70% of persons with raised blood cholesterol or hypercholesterolaemia were unaware of their condition but detected by biochemical testing during health examination provided under the survey (Table 1)[9].

Table 1: Proportion of raised blood cholesterol or hypercholesterolaemia (including self-reported doctor-diagnosed hypercholesterolaemia and no self-reported history but raised blood cholesterol by biochemical testing) among non-institutionalised persons aged 15–84 by gender and age group

	Self-reported doctor-diagnosed hypercholesterolaemia	No self-reported history but raised blood cholesterol by biochemical testing*	Total
Gender			
Male	17.3%	35.6%	52.9%
Female	14.2%	36.7%	51.0%
Age group			
15–24	0.3%	14.6%	15.0%
25–34	2.9%	29.8%	32.7%
35–44	4.5%	39.3%	43.8%
45–54	12.0%	45.4%	57.4%
55–64	26.6%	45.5%	72.1%
65–84	34.7%	30.8%	65.6%
Overall	15.7%	36.2%	51.9%

Base: All respondents aged 15–84 who had participated in the health examination.
Notes: *No self-reported history but raised blood cholesterol by biochemical testing with total cholesterol higher than or equal to 5.2 mmol/L.
Figures may not add up to the total due to rounding.
Source: Population Health Survey 2020-22.

Be Cholesterol Smart

Be cholesterol smart includes knowing the ways to keep blood cholesterol in checks and having blood cholesterol tested as advised by family doctor. Studies have shown that healthy living (Box 1) can keep 'bad' cholesterol levels low and increase 'good' cholesterol levels in the blood. Of note, hypercholesterolaemia has no signs or symptoms in most cases. Some people may not even know they have it until they have a stroke, heart attack or other serious complication. For those at higher risk of hypercholesterolaemia, regular monitoring of their lipid profiles would help inform decisions about disease prevention strategies (such as lifestyle modifications or use of lipid-lowering agents).

Given that the absolute risks of hypercholesterolemia and stroke (as well as cardiovascular diseases) are higher for older adults, the Hong Kong Preventive Framework for Older Adults in Primary Care Settings provides the following recommendations regarding screening for hyperlipidaemia (high blood lipids)[10]:

- Periodic screening for hyperlipidaemia is recommended for older adults aged 50–75;
- Screen for hyperlipidaemia every 3 years if previous results are within optimal range, and more frequent testing, e.g. every 12 months is recommended when risk factors of cardiovascular diseases (such as smoking, obesity, diabetes, hypertension, etc.) are present.

Box 1: Healthy living for maintaining an optimal blood cholesterol level

Eat a balanced diet — Members of the public should eat according to the "Healthy Eating Food Pyramid" and limit foods high in fat, salt and sugar[11]. The World Health Organization recommends that adults should limit total fat intake to 30% of total energy intake or less. Fat consumed should be primarily unsaturated fatty acids, with no more than 10% of total energy intake coming from saturated fatty acids and no more than 1% of total energy intake from trans-fatty acids from both industrially produced and ruminant animal sources[12, 13]. Dietary fibers (which are components of plant-based foods) can lower blood cholesterol by binding the cholesterol particles in the small intestine, preventing them from entering blood-stream and excreting them through faeces. Apart from limiting consumption of foods high in saturated fat and trans fat, adults are urged to eat at least 5 servings of fruit and vegetables per day and choose more whole grains and cereals. Studies showed that increasing fruit consumption would reduce the level of triglycerides[14], while consumption of whole grains could lower the levels of low-density lipoprotein and total cholesterol[15].

Be physically active and avoid prolonged sitting — Aerobic exercises help reduce low-density lipoprotein and triglycerides as well as increase high-density lipo-protein[16]. Breaking up long periods of sitting with physical activity can attenuate triglyceride concentrations in blood[17]. Adults should engage in at least 150–300 minutes of moderate-intensity aerobic physical activity, or at least 75–150 minutes of vigorous-intensity aerobic physical activity, or an equivalent amount of physical activity throughout the week[18]. In addition, they should limit the amount of time spend being sedentary and replace sitting time with physical activity of any intensity including light intensity physical activity (such as walking)[18].

Do not smoke — The toxic chemicals in cigarettes (including combustible and electronic cigarettes) can affect the way the body process cholesterol. Compared with non-smokers, smokers would have higher levels of both low-density lipoprotein and triglycerides but lower levels of high-density lipoprotein[19, 20]. For health, non-smokers should never start smoking while smokers should quit smoking immediately. For free quit tools and services, please visit https://www.livetobaccofree.hk/en/index.html or call the Quitline 1833 183.

Refrain from alcohol drinking — Ethanol is known to affect lipid metabolism and excessive alcohol intake would elevate the level of triglycerides[21, 22]. A study used the Alcohol Use Disorders Identification Test (AUDIT) questionnaire to categorized drinking patterns among Korean men reported that those who were classified as high-risk drinkers would have 20% and 98% increased risk for hypercholesterolaemia and hypertriglyceridaemia compared with those who were classified low-risk drinkers, respectively[23]. The DH urges drinkers to appraise their drinking habits and identify potential health effects by answering the Alcohol and Health Questionnaire (AUDIT#) at https://www.change4health.gov.hk/filemanager/common/pdf/presentation_material/dh_audit_2017_audit_questionnaire_en.pdf) as well as appreciate the benefits of stopping drinking. For more information about alcohol and health, please visit the Change for Health website of DH at https://www.change4health.gov.hk.

Having an optimal blood cholesterol level is important for everyone regardless of their age. While members of the public are encouraged to lead a healthy lifestyle and have regular blood cholesterol checked as recommended, DH will continue to monitor the health status of local population, organise health promotional campaigns to increase people's heath literacy in disease prevention, as well as work in close partnership with various stakeholders to foster a health-enhancing environment.

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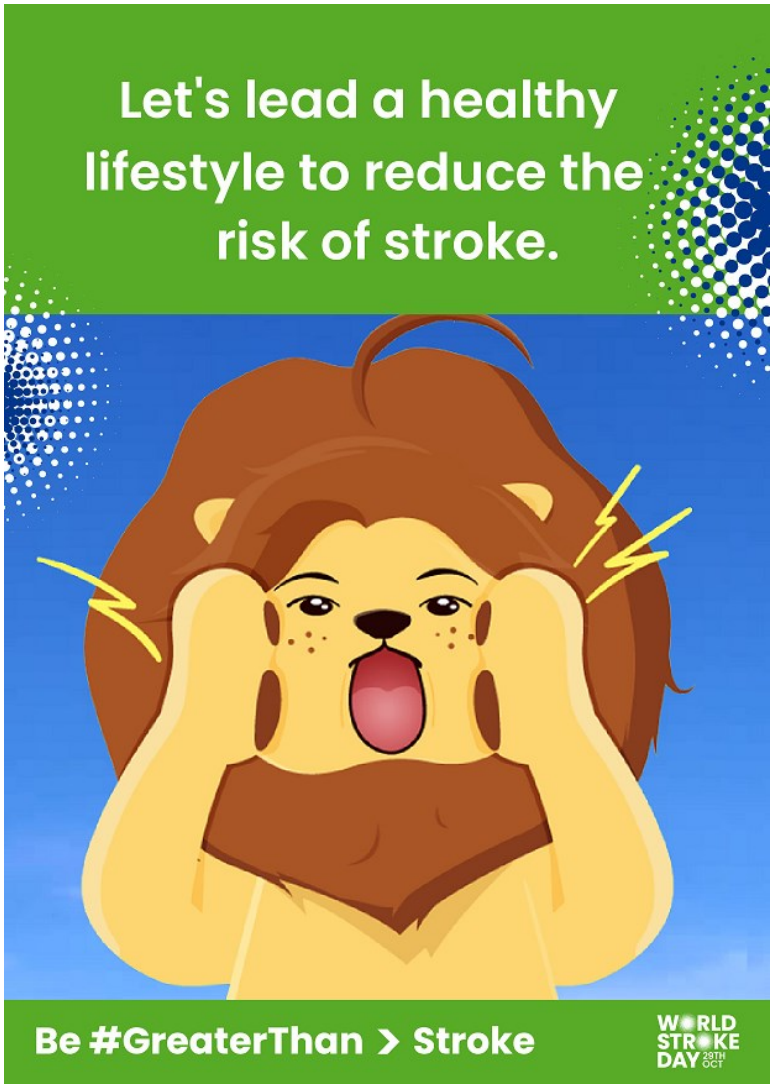
World Stroke Day

29 October 2023

Stroke is the leading cause of disability worldwide and each year over 12 million people have strokes. But up to 90% of strokes are preventable and by addressing a small number of those risk factors responsible for most strokes.

This year the World Stroke Organization is calling on stakeholders around the world to come together on October 29th to share key messages on stroke prevention and to take action that will help individuals to understand, identify and address stroke risks that are not only associated with highest risk of stroke, but that are also easily managed.

For more information about the World Stroke Day, please visit https://www.world-stroke.org/world-stroke-day-campaign/world-stroke-day-2023.



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