

Stroke Awareness and Prevention

Key Messages

- ※ Stroke is a major public health issue. In 2019, stroke was the second leading cause of ill-health, disability and premature death worldwide among people aged 50 or above.
- ※ Studies show that 90.7% of stroke worldwide are collectively attributed to 10 modifiable behavioural and biomedical risk factors. Leading risk factors for stroke include high systolic blood pressure, high body mass index, high fasting plasma glucose, and smoking.
- ※ In Hong Kong, stroke was the fourth commonest cause of death in Hong Kong with 3 164 registered deaths in 2020. More importantly, stroke risk factors are prevalent among local general population.
- ※ To reduce the risk of having a stroke, members of the public should lead a healthy lifestyle and regularly check for “triple H” (high blood pressure, high blood glucose and high blood lipids) as recommended by the relevant Reference Frameworks. Members of the public should also get familiar with the warning signs of stroke and act “FAST” for help if indicated.
- ※ The Department of Health will continue to step up efforts in enhancing public awareness about the importance of healthy living in stroke prevention and continue working in close partnership with other government bureaux and departments as well as community partners to build a health-enhancing environment.

Stroke Awareness and Prevention

Stroke is a major public health issue. It occurs when the blood supply to part of the brain is cut off, usually because the artery of the brain is blocked by a clot or ruptures. Without the oxygen and nutrients carried by blood, brain cells die and it can lead to brain damage with various degrees of disability (such as limb weakness, speech impairment, memory loss, paralysis on one side of the body etc.), and even death. Between 1990 and 2019, the absolute number of prevalent strokes, incident stroke cases, and deaths from stroke across the globe increased 85%, 70%, and 43%, respectively. In 2019, there were over 101 million prevalent cases of stroke, 12.2 million of incident cases and 6.5 million deaths.¹ Among people aged 50 or above, stroke was the second leading cause of ill-health, disability and premature death.²

Risk Factors of Stroke

The risk of having a stroke increases if an individual has certain risk factors. While some risk factors are non-modifiable (such as advancing age with incidence of stroke doubling for each decade after 55 years of age and family history of stroke), most are preventable or modifiable.³ An international study with 26 919 participants from 32 countries reported that 90.7% of stroke (91.5% for ischaemic stroke; 87.1% for intracerebral haemorrhagic stroke) worldwide were collectively attributed to 10 modifiable behavioural and biomedical risk factors (Box 1).⁴ Studies also found exposures to higher level of air pollution was associated with increased stroke risk.⁵ In 2019, the five leading risk factors for stroke were high systolic blood pressure, high body mass index, high fasting plasma glucose, ambient air pollution, and smoking.¹ Thus, targeting and addressing these major modifiable risk factors would result in a marked reduction in the global burden of stroke.^{4,6}

Burden of Stroke in Hong Kong

Stroke is a major cause of morbidity and mortality in Hong Kong. Thematic Household Surveys conducted by the Census and Statistics Department reported that the number of persons who had a stroke as told by practitioners of Western medicine increased by 52%, from 37 800 in 2009/10 to 57 500 in 2018/19.^{10, 11} In 2020, stroke was the fourth commonest cause of death in Hong Kong with 3 164 registered deaths and a crude death rate of 42.3 per 100 000 population.¹²

More importantly, stroke risk factors are prevalent among local general population. Among non-institutional persons aged 15 or above, Health Behaviour Survey 2018/19 of the Department of Health (DH) observed that 13.2% of them reported current smoking at the time of survey (whether smoking on a daily basis or less often and regardless of what types of smoking products); 8.8% of them drank regularly (i.e. drank at least once a week) and 2.9% of them reported binge drinking (i.e. having 5 drinks or more on a single occasion) at least monthly; 9.9% of them consumed processed meat and associated products at least once per day. Among adults aged 18 and above, 16.8% of them had insufficient physical activity.¹³ Moreover, the Population Health Survey (PHS) 2014/15 collected health-related data through questionnaire and health examination involving physical measurements and biochemical testing. Results showed that 86.3% of the non-institutional persons aged 15–84 had excessive sodium intake; 40.1% had abdominal obesity; 27.7% had hypertension; 8.4% had diabetes; and 49.5% had hypercholesterolaemia.¹⁴

PHS 2014/15 also adopted the Framingham risk model with assessment based on specific criteria (including age, gender, smoking status, levels of systolic blood pressure and blood cholesterol) to predict the risk of all cardiovascular outcomes including stroke. Among the persons aged 30-74,

16.4% were classified as high-risk (10-year cardiovascular disease risk $\geq 20\%$), 18.3% as medium-risk (10-year cardiovascular risk $\geq 10\%$ and $< 20\%$) and 65.4% as low-risk (10-year cardiovascular disease risk $< 10\%$) according to the Framingham risk model.¹⁴

Box 1: Major modifiable risk factors for stroke

Smoking — Compared to never or former smokers, current smokers would have 67% increased risk of stroke.⁴

Alcohol consumption — Compared to never or former drinkers, heavy or binge drinkers were about 2.1 times as likely to have a stroke. Low or moderate drinkers would also have 14% increased risk of stroke.⁴

Unhealthy eating — Risk of stroke increased by 6% for 1 gram (g) per day increment in dietary sodium intake.⁷ Each additional daily 50 g of processed meat consumption and 100 g of red meat consumption was associated with 17% and 12% increased risk of stroke, respectively. Also, risk of stroke would increase by 7% for each additional daily 250 ml of sugar-sweetened beverages.⁸

Physical inactivity — Compared to physically active people, people who were physically inactive would have 16% increased risk of stroke.⁹

Psychosocial factors — Compared to people who reported experiencing no psychological stress, people with perceived psychological stress were 2.2 times as likely to have a stroke.⁴

Abdominal obesity — Waist-to-hip ratio (derived by waist measurement divided hip measurement) is a measure of central obesity. The higher the ratio, the higher is the stroke risk. Compared to people in the lowest tertile waist-to-hip ratio, people in the second tertile and third tertile of waist-to-hip ratio would have 24% and 44% increased risk of stroke, respectively.⁴

Hypertension — Compared to people without hypertension, people with self-reported history of hypertension or having systolic blood pressure higher than or equal to 140 mm Hg and/or diastolic blood pressure higher than or equal to 90 mm Hg (indicating hypertension) were about 3 times as likely to have a stroke.⁴

Blood lipid disorder — Apolipoprotein B (ApoB) constitutes a major component of low-density lipoprotein (“bad”) cholesterol, whereas apolipoprotein A1 (ApoA1) is the major component of high-density lipoprotein (“good”) cholesterol. So ApoB to ApoA1 ratio (derived by ApoB divided by ApoA1) could reflect the balance between ‘bad’ and ‘good’ cholesterol particles in blood. The higher the ratio, the higher is the stroke risk. Compared to people with ApoB/ApoA1 ratio in the lowest tertile, people within the second tertile and third tertile would have 28% and 84% increased risk of stroke, respectively.⁴

Diabetes — Compared to people without diabetes, people with self-reported history of diabetes or having a value of glycated haemoglobin (HbA1c) higher than or equal to 6.5% (indicating diabetes) would have 16% increased risk of stroke.⁴

Cardiac causes — Compared to people without heart disease, people with a heart disease (such as atrial fibrillation, previous valvular heart disease or myocardial infarction) were about 3.2 times as likely to have a stroke.⁴

Be Stroke Aware

Being stroke aware not only involves knowing the causes and major risk factors of the disease, but also getting familiar with the ways to reduce stroke risk and the warning signs of stroke, as well as acting fast to reduce the risk of disabilities or even death when a stroke strikes.

Healthy Living

Stroke risk can be reduced by adhering to a healthy lifestyle (Box 2). Of note, studies show that infections (including respiratory infections) can trigger acute stroke, while getting vaccinated as recommended can reduce the risk of stroke (such as vaccinations against influenza in older people).¹⁵ Compared to unvaccinated individuals, those who received vaccination against influenza would have 18% reduced risk of stroke.¹⁶ In patients with coronavirus disease 2019 (COVID-19), especially in those who are severely infected and have pre-existing

vascular risk factors, acute stroke is not uncommon.¹⁷ One Swedish study involving over 86 700 patients with COVID-19 and about 348 400 matched control individuals suggested that COVID-19 was a significant risk factor for ischaemic stroke.¹⁸ As the benefit of COVID-19 vaccination generally exceeds the risk, unless there is contraindication, members of the public with stable chronic conditions should get vaccinated as soon as possible for their own protection.¹⁹ If members of the public have any concerns, they are encouraged to consult doctors about recommended vaccinations and the best timing for vaccination. To know about the Government Vaccine Programme/Schemes, including seasonal influenza vaccination, please visit www.chp.gov.hk/en/features/17980.html. For more details about COVID-19 Vaccination Programme, please visit www.covidvaccine.gov.hk/en/.

Box 2: Preventing stroke through healthy behaviours

Do not smoke. Current smokers should quit smoking, noting that risk of stroke would reduce after smoking cessation and be comparable to that of non-smokers in 5 to 15 years.²⁰ For information on quitting and smoking cessation services, please visit www.livetobaccofree.hk or call the Integrated Smoking Cessation Hotline 1833 183.

Refrain from alcohol consumption. A prospective study of 500 000 men and women in China showed that alcohol consumption uniformly increases blood pressure and stroke risk, and there is no protective effect of low level of alcohol consumption against stroke.²¹ Drinkers are thus urged to stop drinking and hypertensive patient should not drink at all.

Eat a balanced diet. Apart from limiting consumption of fats, salt and sugar, members of the public are encouraged to eat at least 5 servings (or 400 g) of fruit and vegetables per day.²² Studies showed that each additional daily 100 g of vegetables consumption was associated with 8% reduced risk of stroke. For each additional daily 100 g of fruit consumption, the risk of stroke would reduce by 10%.⁸

Be physically active. Physical activity can protect against stroke through reduced overall adiposity and intra-abdominal fat, lower blood pressure, improved insulin sensitivity, increased ‘good’ cholesterol particles and decreased ‘bad’ cholesterol particles in blood, relieved psychological stress and improvement in fitness, etc. For substantial health benefits, adults should engage in at least two and a half hours of moderate-intensity physical activity or one hour and 15 minutes of vigorous-intensity physical activity throughout the week.²³

Recommended Screenings for “Triple H”

“Triple H” generally refers to high blood pressure, high blood glucose and high blood lipids. As such conditions seldom cause symptoms in their early stages, many people do not know they have either one or even all of the three health problems. The purpose of screening is to identify asymptomatic individuals who are likely to have these health problems, so that early intervention or treatment can be initiated to prevent disease progression and complications.

The Expert Panel on Reference Frameworks was established by the Food and Health Bureau to develop, update and promulgate the Reference Frameworks in primary healthcare setting. In the Reference Frameworks, recommendations regarding screening of hypertension, type 2 diabetes and hyperlipidaemia in general population are as follows:

- ◇ Adults aged 18 years or above are recommended to have their blood pressure checked at least once every two years. For older adults aged 65 years or above, annual screening is recommended.^{24, 25}
- ◇ Periodic screening of diabetes is recommended for individuals starting from age 45 years. Screen for diabetes every three years if previous results are normal, 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.^{25, 26}
- ◇ Periodic screening of hyperlipidaemia is recommended for older adults aged 50 to 75 years. Screen for hyperlipidaemia every three years if previous results are within normal 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.²⁵

Identifying a Stroke “FAST”

A stroke is a medical emergency. When it occurs, time is muscle: the earlier the person takes heed of the stroke symptoms and receive treatment, the better result it would be. Thus, members of the public are urged to be familiar with the warning signs of stroke (including transient ischaemic attack or known as “mini-stroke”), and act “FAST” for help if indicated (Box 3).²⁷

Of note, the World Stroke Organization established World Stroke Day on 29 October as to provide a global platform for the stroke community to increase awareness and drive action on stroke around the world. For World Stroke Day 2021, it will raise awareness of the stroke signs and the importance of acting FAST in the aftermath of a stroke in order to save lives, reduce disabilities and improve treatment outcomes. To know more about World Stroke Day, please visit the thematic website: www.world-stroke.org/world-stroke-day-campaign.

Box 3: Warning signs of stroke



- Numbness / weakness of the face, arm and leg (especially on one side of the body)
- Sudden occurrence of a wry mouth and drooling
- Sudden slurring of the speech or trouble understanding
- Sudden and severe headaches
- Troubling seeing on one or both eyes
- Sudden difficulties in swallowing
- Dizziness, loss of balance or coordination, nausea and vomiting with no known cause

(Source: Hong Kong Stroke Fund. Available at www.strokefund.org/eng/stroke_part_newadd1.php.)

Yet prevention is better cure. For individuals, it is best to take positive steps to guard against stroke. DH will continue to step up efforts in enhancing public awareness about the importance of healthy living in stroke prevention and continue working in close partnership with other government bureaux and departments as well as community partners to build a health-enhancing environment. For more information about government's initiatives and actions to prevent and control non-communicable diseases including stroke, please visit the thematic website at www.change4health.gov.hk/en/saptowards2025/.

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