

Hypertension in the Time of COVID-19

Key Messages

- ※ An adult is said to have hypertension if systolic blood pressure is persistently higher than or equal to 140 millimetres of mercury (mmHg) and/or diastolic blood pressure is persistently higher than or equal to 90 mmHg.
- ※ Hypertension seldom causes symptoms until complications develop. The Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings recommends adults aged 18 or above to have regular measurement of blood pressure for early detection and treatment.
- ※ In patients with coronavirus disease (COVID-19), those with hypertension were about 2–3 times as likely to become seriously ill and up to 3.5 times as likely to die from COVID-19 compared with those without hypertension.
- ※ In Hong Kong, the Population Health Survey 2014/15 observed that the overall prevalence of hypertension among non-institutionalised persons aged 15–84 was 27.7% (30.1% for males; 25.5% for females).
- ※ To prevent and control hypertension, members of the public should live a healthy lifestyle, among others, which can also boost the immune system and reduce the risk of severe COVID-19.
- ※ Everyone including those with hypertension needs to take appropriate precautions to guard against COVID-19, such as maintaining good personal hygiene, reducing social contact and wearing masks in public places.
- ※ Individuals with chronic diseases such as hypertension have increased risk of morbidity and mortality from COVID-19 infection. As the benefit of COVID-19 vaccination among those with stable clinical conditions generally exceeds the risk, unless there is contraindication, those with stable condition should consider proceeding to vaccination. Individuals are encouraged to consult their family doctors about COVID-19 vaccination. However, if one's hypertension is uncontrolled with regard to the systolic and diastolic blood pressure, or is adjusting drug dosage for better control, or has newly developed acute symptoms of complications, one may have to consider deferring vaccination until better control is achieved. For more information about COVID-19 Vaccination Programme, please visit www.covidvaccine.gov.hk/en/.

Hypertension in the Time of COVID-19

Hypertension (or high blood pressure) is one of the major causes of morbidity, disability and premature death for most countries. Globally, an estimated 1.13 billion people have hypertension.¹ In the past decade, the number of disability-adjusted life-years (i.e. the number of years lost due to ill-health, disability and early deaths) and mortality attributed to high (systolic) blood pressure increased about 15% and 18% globally, respectively. In 2019, the Global Burden of Disease Study reported that high (systolic) blood pressure accounted for 235 million disability-adjusted life-years and claimed 10.8 million human lives worldwide.²

Understanding Blood Pressure Readings

Blood pressure is the force of blood pushing against the walls of arteries as the heart pumps out blood. It is expressed in two numbers. The first number is ‘systolic pressure’ which is the pressure exerted upon the walls of blood vessels when the heart contracts. The second number is ‘diastolic pressure’ that represents the pressure exerted upon the walls of blood vessels when the heart relaxes.

Throughout the day, blood pressure changes from minutes to minutes with posture, physical activities, emotions, sleep, etc. But for an adult, if systolic blood pressure is persistently higher than or equal to 140 millimetres of mercury (mmHg) and/or diastolic blood pressure is persistently higher than or equal to 90 mmHg, the person is said to have hypertension. Systolic blood pressure between 120 mmHg and 139 mmHg or diastolic blood pressure between 80 mmHg and 89 mmHg is considered as pre-hypertension that should also be of concern. Of note, hypertension seldom causes symptoms until complications develop. Most people therefore are unaware they have such “silence” disease. Extremely high blood pressure may cause symptoms like dizziness, visual disturbance, headache, fatigue and facial flushing. The Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings recommends adults aged 18 or above to have regular measurement of blood pressure for early detection and treatment according to the blood pressure categories as shown in Table 1.³

Table 1: Categories of blood pressure levels in adults and recommended follow-up actions

Blood pressure categories	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)	Recommendations
Optimal	lower than 120	lower than 80	Recheck in 2 years (once a year for people aged over 75)
Normal	120 to 129	80 to 84	Recheck in 1 year
High normal	130 to 139	85 to 89	Recheck in 6 months
Hypertension	higher than or equal to 140	higher than or equal to 90	Consult family doctor as soon as possible for advice

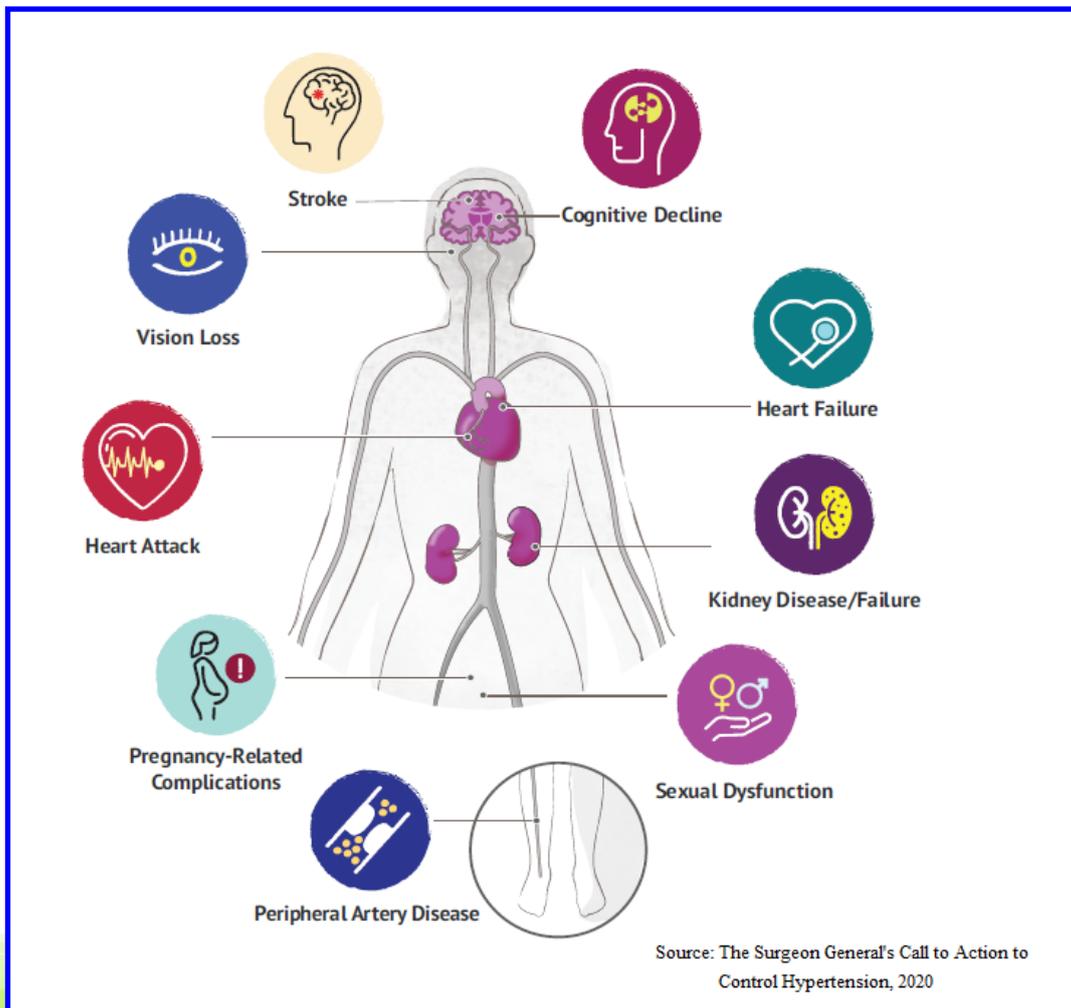
Source: Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings [Patient Version], December 2018.

Hypertension's Connection to COVID-19 Severity

With the emergence of coronavirus disease (COVID-19), it has become evident that people with untreated or uncontrolled hypertension appear to be more vulnerable to becoming seriously ill if infected with the virus.⁴ As shown in Figure 1, hypertension can damage many body systems and organs and lead to a wide range of health problems⁵ including heart disease, stroke and kidney disease, that are known to increase the risk of COVID-19 complications.^{4, 6} Reports from Mainland China and other countries (such as USA, Italy, France, Spain, South Korea and Singapore) showed that hypertension was one of the most common underlying diseases among patients with severe or fatal COVID-19, with proportions ranging from 32% to 67%.⁷ In patients with COVID-19, those with hypertension were about 2–3 times as likely to become seriously ill^{8,9} and up to 3.5 times

as likely to die from COVID-19 compared with those without hypertension.⁹ While the mechanisms for the association between hypertension and COVID-19 severity remain unclear, it has been hypothesised that the causative virus could impair the regulatory mechanism of blood pressure, leading to acute adverse outcomes of hypertension (such as multi-organ dysfunction). The virus can also induce inflammation and cause injury of the heart muscle directly,^{10, 11} posing additional risks to hypertensive patients. Furthermore, hypertension is highly prevalent among the elderly and is a common comorbidity of obesity and diabetes, all of which are major determinant factors for COVID-19 severity and mortality.^{8, 12}

Figure 1: Health problems caused by hypertension

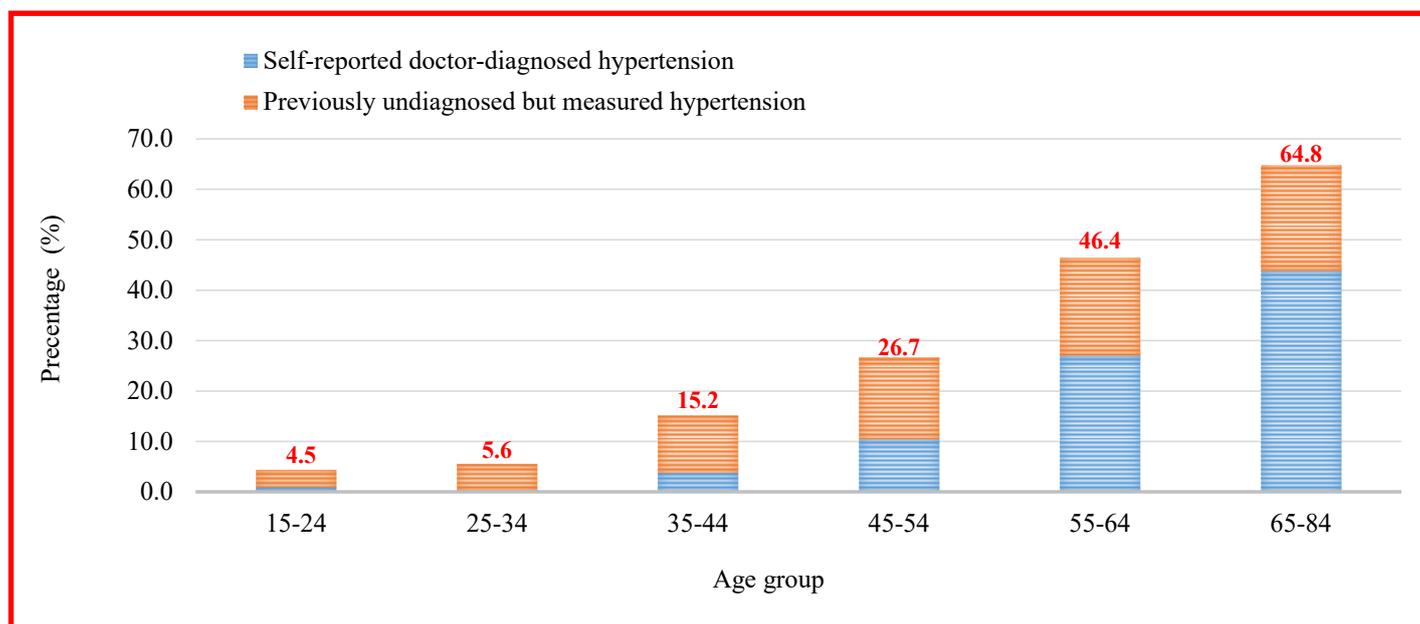


Prevalence of Hypertension among Hong Kong Population

In Hong Kong, more and more people are living with hypertension, many with no awareness of their condition. Territory-wide household surveys conducted by the Census and Statistics Department found that the prevalence of hypertension as told by practitioners of Western medicine among non-institutionalised persons increased from 10.3% in 2009/10 to 14.5% in 2018/19.¹³ The Population Health Survey (PHS) 2014/15 of the Department of Health (DH) also observed that 14.6% of non-institutionalised persons aged 15–84 (15.2% for males; 14.0% for females) self-reported having doctor-diagnosed hypertension. However, the survey detected another 13.2% of persons (14.9% for males; 11.5% for females) not previously diagnosed but detected to have hypertension (with systolic blood

pressure higher than or equal to 140 mmHg and/or diastolic blood pressure higher than or equal to 90 mmHg) during the health examination provided under the PHS 2014/15. These gave an overall prevalence of hypertension of 27.7% (30.1% for males; 25.5% for females). As shown in Figure 2, the prevalence of hypertension increased with age, from 4.5% among persons aged 15–24 to 64.8% among persons aged 65–84.¹⁴

Figure 2: Prevalence of hypertension among non-institutionalised persons aged 15–84 by age group



Source: Population Health Survey 2014/15, Department of Health.

Prevention and Control of Hypertension

Many factors can increase the risk of hypertension. While some risk factors are intrinsic to individuals and non-modifiable (such as advancing age and family history of hypertension), many are potentially preventable or modifiable (including excessive salt intake, lack of physical activity, obesity, smoking and alcohol drinking). To prevent and control

hypertension, members of the public are encouraged to lead a healthy lifestyle (Box 1), among others, which can also boost the immune system and reduce the risk of severe COVID-19. For more information about healthy living, please visit the Change for Health website of DH: www.change4health.gov.hk.

Box 1: Health Tips for prevention and control of hypertension



Maintain an optimal body weight and waist circumference. Obesity, especially central obesity, is a major cause of hypertension. It has been estimated that 60–70% of hypertension in adults is attributed to adiposity.¹⁵ Chinese adults in Hong Kong should aim to maintain a body mass index (BMI) between 18.5 and 22.9. Irrespective of BMI, men should keep their waist circumference below 90 cm (about 35.5 inches) and women should keep theirs below 80 cm (about 31.5 inches).



Cut back on salt and eat a balanced diet. Excessive salt intake is a major factor contributing to the development of hypertension: the higher the salt intake, the higher the risk. Healthy adults should consume less than 5 g (around 1 teaspoon) of salt a day.¹⁶ Eat at least 5 servings of fruit and vegetables a day with appropriate amounts of wholegrain products, fish, poultry or lean meat. Also limit fats and sugars intake.



Be physically active. Sedentary behaviour can lead to obesity with a weaker heart which then increases the risk of hypertension. For substantial health benefits, 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 combination of moderate- and vigorous-intensity activity throughout the week.¹⁷ In the wake of COVID-19 pandemic, members of the public can do home-based exercises, carry out household chores or join online exercise classes in order to maintain physically active. Hypertensive patients can consult family doctor to help determine the type and amount of activity appropriate for them.



Do not smoke. Smoking affects the sympathetic nervous system and causes stiffening of the arteries, leading to a rise in blood pressure. Smokers and members of the public can visit www.livetobaccofree.hk or call the Quitline 1833 183 for information on quitting and for smoking cessation services.



Avoid alcohol consumption. Alcohol raises blood pressure through a number of neural, hormonal and physiological actions that cause constriction of blood vessels, elevated heart rate, increased cardiac output, or augmented fluid and sodium content in the blood. Besides, alcohol is extremely calorific with 7 kilocalories per gram. These additional calories contribute to increased body fat and weight gain. It is also noteworthy that alcohol weakens the immune system, undermining the body's ability to fight off infectious diseases. While drinkers are encouraged to stop drinking, hypertensive patient should not drink at all.

For people with hypertension, self-care is the cornerstone of optimal disease management. Hypertensive patients should learn about the disease so that they can take an active role in management of the condition, such as self-monitoring their blood pressure and good compliance with medical treatment and dietary advice. Equally important, they should not stop or change their hypertensive medication(s) without consulting their family doctor. For more information about the disease, please refer to the Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings [Patient Version] at www.fhb.gov.hk. Everyone including those with hypertension needs to take appropriate precautions to guard against COVID-19, such as maintaining good personal hygiene, reducing social contact and wearing masks in public places. Individuals with chronic diseases such as hypertension have increased risk of morbidity and mortality from COVID-19 infection. As the benefit of COVID-19 vaccination among those with stable clinical conditions generally exceeds the risk, unless there is contraindication, those with stable condition should consider proceeding to vaccination. Individuals are encouraged to consult their family doctors about COVID-19 vaccination. However, if one's hypertension is uncontrolled with regard to the systolic and diastolic blood pressure, or is adjusting drug dosage for better control, or has newly developed acute symptoms of complications, one may have to consider deferring vaccination until better control is achieved. For more information about COVID-19 Vaccination Programme, please visit www.covidvaccine.gov.hk/en/. To keep the COVID-19 at bay, everyone has a role to play. To know the latest news of COVID-19, please visit www.coronavirus.gov.hk/eng/index.html. Together, we fight the virus!

References

1. Hypertension. Geneva: World Health Organization, 13 September 2019. Available at www.who.int/news-room/fact-sheets/detail/hypertension.
2. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020;396(10258):1223-1249.
3. Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings (Revised Edition). Hong Kong SAR: Task Force on Conceptual Model and Preventive Protocols of the Working Group on Primary Care, Food and Health Bureau, December 2018.
4. Information Note on COVID-19 and Noncommunicable Diseases. Geneva: World Health Organization. Available at www.who.int/publications/m/item/covid-19-and-ncds.
5. The Surgeon General's Call to Action to Control Hypertension. Washington, D.C.: U.S. Department of Health and Human Services, Office of the Surgeon General, 2020.
6. Wang X, Fang X, Cai Z, et al. Comorbid chronic diseases and acute organ injuries are strongly correlated with disease severity and mortality among COVID-19 patients: a systemic review and meta-analysis. *Research* 2020;2020:2402961.
7. Zhou Y, Yang Q, Chi J, et al. Comorbidities and the risk of severe or fatal outcomes associated with coronavirus disease 2019: A systematic review and meta-analysis. *International Journal of Infectious Diseases* 2020;99:47-56.
8. de Almeida-Pititto B, Dualib PM, Zajdenverg L, et al. Severity and mortality of COVID 19 in patients with diabetes, hypertension and cardiovascular disease: a meta-analysis. *Diabetology & Metabolic Syndrome* 2020;12:75.
9. Zhang J, Wu J, Sun X, et al. Association of hypertension with the severity and fatality of SARS-CoV-2 infection: A meta-analysis. *Epidemiology and Infection* 2020;148:e106.
10. Babapoor-Farrokhran S, Gill D, Walker J, et al. Myocardial injury and COVID-19: possible mechanisms. *Life Sciences* 2020;253:117723.
11. Nishiga M, Wang DW, Han Y, et al. COVID-19 and cardiovascular disease: from basic mechanisms to clinical perspectives. *Nature Reviews Cardiology* 2020;17(9):543-558.
12. Popkin BM, Du S, Green WD, et al. Individuals with obesity and COVID-19: A global perspective on the epidemiology and biological relationships. *Obesity Reviews* 2020;21(11):e13128.
13. Thematic Household Survey Report Reports (No. 45, 50, 58, 63 and 68) : Health Status of Hong Kong Residents. Hong Kong SAR: Census and Statistics Department.
14. Population Health Survey 2014/15. Hong Kong SAR: Department of Health.
15. Kotchen TA. Obesity-related hypertension: epidemiology, pathophysiology, and clinical management. *American Journal of Hypertension* 2010;23(11):1170-1178.
16. Guideline: Sodium intake for adults and children. Geneva: World Health Organization, 2012.
17. WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva: World Health Organization, 2020.



The Leisure and Cultural Services Department (LCSD) launched a new phase of “Online Interactive Sports Training Programmes” in April 2021.

The “Online Interactive Sports Training Programmes” are conducted by coaches through an online platform in real time, enabling participants to learn interactively and practise physical activities at home, and to establish a healthy lifestyle. There are ten types of programmes, including aerobic dance, fitness exercise, body-mind stretch, parent-child fitness, tai chi, fitness yoga and hip hop dance as well as the newly-organised courses on badminton, play tennis and table tennis, introducing the basic grip, ball control, footwork and physical coordination skills of these ball games. The courses are designed by relevant national sports associations and are suitable for people of all ages.

Participants can join the online courses at home by using their desktop, tablet computers or mobile phones, with Zoom software downloaded in advance. Both daytime and nighttime courses will be held, with each course consisting of two or three one-hour sessions.

Members of the public can enrol on a first-come, first-served basis starting from 8:30am on the first day of enrolment through Leisure Link Internet Booking service (leisurelink.lcsd.gov.hk). The course fee is \$20. Please visit the LCSD website (www.lcsd.gov.hk/en/visavis) or call 2414 5555 for details.

The “Online Interactive Sports Training Programmes” are part of the interactive "vis-a-vis +01" series under the LCSD Edutainment Channel (www.lcsd.gov.hk/en/edutainment-channel.html) which promote leisure and culture through a one-stop online platform covering informative and learning materials.

May Measurement Month & World Hypertension Day



May Measurement Month (MMM) is a global blood pressure awareness campaign, incorporating World Hypertension Day on 17 May with a theme ***Know Your Numbers***. The purpose of the campaign is to promote public awareness of hypertension and to encourage citizens of all countries to check their blood pressure and take actions to prevent and control this silent killer. For more information about the campaign, please visit the thematic website at ish-world.com/public/may-measurement-month-whd/.

Having regular blood pressure checks allow early detection of hypertension. Adults aged 18 or above are advised to have their blood pressure checked at least every two years and adopt a healthy lifestyle. More frequent intervals may be required according to the blood pressure level, individuals' age, overall cardiovascular risk profile, and doctor advice. For more details, please refer to the Hong Kong Reference Framework for Hypertension Care for Adults in Primary Care Settings. The document is available on the website of the Food and Health Bureau of the Hong Kong Government (www.fhb.gov.hk).

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.

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