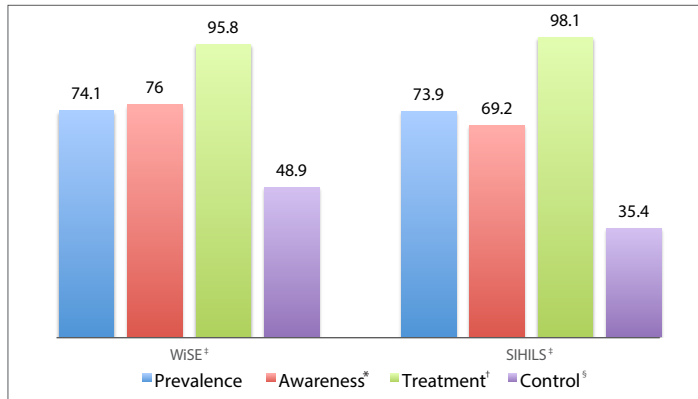


HYPERTENSION: RATIONALE FOR TREATMENT

Why normal BP is important?

Singapore has one of the fastest ageing populations with a life expectancy of up to 82 years.¹ While rates of hypertension awareness* and treatment† were high, as shown in 2 studies done in Singapore (WiSE and SIHILS‡), control§ rates were relatively low (Figure 1).¹



*Awareness was defined as a prior diagnosis by a doctor.

†Treatment was defined as the current pharmacological treatment initiated by doctors to lower BP.

‡WiSE=Well-being of the Singapore Elderly; SIHILS=Singapore Social Isolation, Health, and Lifestyle Survey.

§Control was defined as having a current systolic BP <140 mmHg and diastolic BP <90 mmHg.

Figure 1. Rates of hypertension prevalence, awareness, treatment, and control from 2 studies¹

If hypertension remains unaddressed or undetected, cardiovascular disease (CVD), end-organ damage (eg, retinopathy and nephropathy), stroke, and premature death as well as annual health care costs are likely to increase.¹⁻⁴ Every 2-mmHg increase in systolic blood pressure (BP) is associated with a mortality risk from ischaemic heart disease (IHD) of 7% and mortality risk from stroke of 10%.³

A meta-analysis of 61 prospective studies showed that BP reduction can result in cardiovascular risk reduction—a 10-mmHg lower usual systolic BP or a 5-mmHg lower DBP was associated with a 40% reduction in death due to stroke and 30% reduction in death due to ischaemic heart disease. Taking antihypertensive medications is also associated with significant reductions in the incidence of myocardial infarction (MI), stroke, and heart failure (Figure 2).⁵

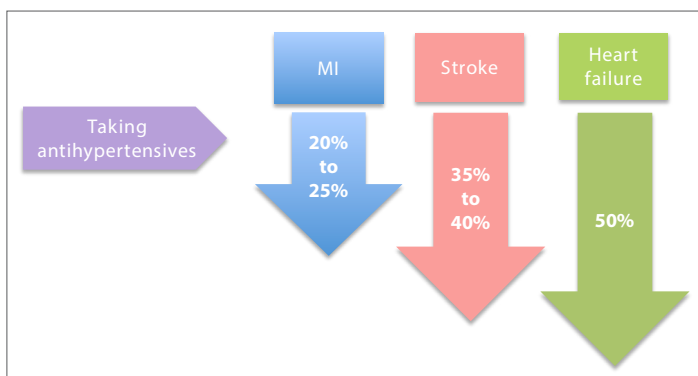


Figure 2. Cardiovascular benefits of taking antihypertensive medications⁵

Pharmacologic management of hypertension

The most significant impact of BP-lowering drugs is that they can provide a CVD risk reduction that is fairly constant and comparable across different groups—defined by age, gender,

body mass index, and the presence or absence of comorbidities such as diabetes mellitus, chronic kidney disease, or atrial fibrillation.^{6,7}

There are different pharmacologic agents that lower BP^{5,6} We briefly discuss them here, their mechanisms of action (MOA), other conditions to which they are beneficial, and conditions in which they are contraindicated (Table 1).

Table 1. Medications used to treat hypertension

Drug class	MOA	Comorbidity ⁸	Contraindication ⁸
Angiotensin-converting enzyme inhibitors ⁹	Produce vasodilation by inhibiting the formation of angiotensin II and cause vasodilation and reduction of arterial pressure and load on the heart	Left ventricular hypertrophy Renal impairment Previous MI Peripheral artery disease Diabetes Heart failure	Pregnancy Hyperkalaemia Bilateral renal artery stenosis
Angiotensin II receptor blockers ¹⁰	Block the receptors for angiotensin II and cause vasodilation, thereby reducing arterial pressure and load on the heart	Microalbuminuria Renal impairment Previous MI Diabetes Heart failure	Pregnancy Hyperkalaemia Bilateral renal artery stenosis
Beta-blockers ^{11*}	Reduce sympathetic influences that normally stimulate heart rate, heart contractility, and electrical conduction	Previous MI Aortic aneurysm Atrial fibrillation Heart failure	Asthma Atrioventricular block Glucose intolerance
Calcium-channel blockers ¹²	<i>In the blood vessels:</i> inhibition of calcium influx lowers vascular resistance by promoting vascular smooth relaxation <i>In the heart muscle:</i> interference with calcium influx also reduces heart rate and heart contraction	Elderly Left ventricular hypertrophy Atrial fibrillation Peripheral artery disease Isolated systolic hypertension	Heart failure Arrhythmia
Diuretics ^{13,14}	Reduces blood volume, cardiac output, and systemic vascular resistance	Elderly ¹ Heart failure Isolated systolic hypertension‡	Gout Glucose intolerance Pregnancy Hypocalcaemia Hypokalaemia

*The use of beta-blockers as first-line has declined over the years. Studies have shown that, in patients with uncomplicated hypertension, they exert a relatively weak effect in reducing stroke or protecting against coronary artery disease compared to other drugs. In addition, they are associated with unfavourable metabolic effects (ie, weight gain and new-onset diabetes in predisposed patients).^{5,15}

†The 2017 Singapore Ministry of Health Clinical Practice Guidelines on Hypertension recommend prescribing diuretics to elderly patients with caution due to risk of hyperglycemia, fluid depletion, and electrolyte imbalance.¹⁶

‡For elderly patients with isolated systolic hypertension, calcium-channel blockers and diuretics are recommended.^{8,16}

Choice of therapy

The main benefit of treatment is largely and essentially the lowering of BP and this is independent of the class of drug given. All classes of antihypertensive agents have their advantages and contraindications. Choice of therapy ultimately depends on the drug's efficacy, tolerability, and cost as well as the patient's characteristics and level of adherence.⁸

While monotherapy may be the initial treatment approach, as a single agent minimises adverse effects and encourages adherence, effective BP reduction is only achieved in a small number of patients.⁸ In fact, many will subsequently require at least 2 drugs from different classes to achieve their target BP.⁶⁻⁸

Initiating with combination therapy may produce a prompt BP lowering in majority of patients, especially in those with higher BP values and more at-risk patients.⁸ Furthermore, drugs from different classes have pharmacological and physiological synergies that result in more effective BP reduction and fewer side effects.

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