

Hypertension

For an adult client, hypertension occurs when systolic blood pressure is at or greater than 140 mm Hg or diastolic blood pressure is at or greater than 90 mm Hg for two or more assessments of blood pressure. For clients older than 60 years, blood pressure should be less than 150/90.

Essential hypertension, also called primary hypertension, accounts for most cases of hypertension. There is no known cause. Secondary hypertension can be caused by disease states, such as kidney disease, or as an adverse effect of some medications. Treatment for secondary hypertension occurs by removing the cause (adrenal tumor, medication).

Clients who have a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg are considered to have prehypertension. Lifestyle changes are necessary for these clients to help prevent cardiovascular disease.

Prolonged, untreated, or poorly controlled hypertension can cause peripheral vascular disease that primarily affects the heart, brain, eyes, and kidneys. The risk of developing complications increases as blood pressure increases.

Hypertrophy of the left ventricle can develop as the heart pumps against resistance caused by the hypertension.

**HEALTH PROMOTION AND
DISEASE PREVENTION**

- Maintain body mass index of less than 30.
- Clients who have diabetes mellitus should keep blood glucose within a recommended reference range.
- Limit caffeine and alcohol intake.
- Use stress-management techniques during times of stress.
- Stop smoking. Nicotine patches or engaging in a smoking cessation class are potential strategies.
- Engage in exercise that provides aerobic benefits at least 3 times a week.
- Limit sodium and fat intake.

ASSESSMENT

Four bodily mechanisms regulate blood pressure.

Arterial baroreceptors

- Baroreceptors are located in the carotid sinus, aorta, and left ventricle.
- They control blood pressure by altering the heart rate. They also cause vasoconstriction or vasodilation.

Regulation of body-fluid volume: Properly functioning kidneys retain fluid when a client is hypotensive and excrete fluid when a client is hypertensive.

Renin-angiotensin-aldosterone system: Renin is converted into angiotensin II, which causes vasoconstriction and controls aldosterone release, causing the kidneys to reabsorb sodium and inhibit fluid loss.

Vascular autoregulation: This maintains consistent levels of tissue perfusion.

RISK FACTORS**Essential hypertension**

- Positive family history
- Excessive sodium intake
- Physical inactivity
- Obesity
- High alcohol consumption
- African American
- Smoking
- Hyperlipidemia
- Stress
- Age greater than 60 or postmenopausal

Secondary hypertension

- Kidney disease
- Cushing's disease (excessive glucocorticoid secretion)
- Primary aldosteronism (causes hypertension and hypokalemia)
- Pheochromocytoma (excessive catecholamine release)
- Brain tumors, encephalitis
- Medications such as estrogen, steroids, and sympathomimetics
- Pregnancy

EXPECTED FINDINGS

- Clients who have hypertension can experience few or no manifestations. Monitor for the following.
 - Headaches, particularly in the morning
 - Facial flushing
 - Dizziness
 - Fainting
 - Retinal changes, visual disturbances
 - Nocturia

PHYSICAL ASSESSMENT FINDINGS

- When a blood pressure reading is elevated, take it in both arms and with the client sitting and standing.
- There are **levels of hypertension**, as defined by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.
 - **Prehypertension:** systolic 120 to 139 mm Hg; diastolic 80 to 89 mm Hg
 - **Stage I hypertension:** systolic 140 to 159 mm Hg; diastolic 90 to 99 mm Hg
 - **Stage II hypertension:** systolic greater than or equal to 160 mm Hg; diastolic greater than or equal to 100 mm Hg

LABORATORY TESTS

No laboratory tests exist to diagnose hypertension. However, several laboratory tests can identify the causes of secondary hypertension and target organ damage.

- **BUN, creatinine** elevation is indicative of kidney disease.
- **Elevated serum corticoids** detect Cushing's disease.
- **Blood glucose and cholesterol studies** can identify contributing factors related to blood vessel changes.

DIAGNOSTIC PROCEDURES

ECG evaluates cardiac function. Tall R-waves are often seen with left-ventricular hypertrophy.

Chest x-ray can show cardiomegaly.

PATIENT-CENTERED CARE

NURSING CARE

Discuss with the client factors that increase the risk of hypertension and how the client can manage them.

MEDICATIONS

Medications are added to treat hypertension that is not responsive to lifestyle changes alone. Diuretics are often first-line medications. However, clients can require a combination of medications to control hypertension.

CLIENT EDUCATION: Instruct clients who are taking antihypertensives to change positions slowly, and to be careful when getting out of bed, driving, and climbing stairs until the medication's effects are fully known. 

Diuretics

- **Thiazide diuretics**, such as hydrochlorothiazide, inhibit water and sodium reabsorption, and increase potassium excretion.
- Other diuretics can treat hypertension that is not responsive to thiazide diuretics.
 - **Loop diuretics**, such as furosemide, decrease sodium reabsorption and increase potassium excretion.
 - **Potassium-sparing diuretics**, such as spironolactone, affect the distal tubule and prevent reabsorption of sodium in exchange for potassium.

NURSING CONSIDERATIONS: Monitor potassium levels and watch for muscle weakness, irregular pulse, and dehydration. Thiazide and loop diuretics can cause hypokalemia, and potassium-sparing diuretics can cause hyperkalemia.

CLIENT EDUCATION

- Encourage the client to keep all appointments with the provider to monitor efficacy of pharmacological treatment and possible electrolyte imbalance (hyponatremia, hyperkalemia).
- If the client is taking a potassium-depleting diuretic, encourage consumption of potassium-rich foods, such as bananas.

Calcium-channel blockers

Verapamil, amlodipine, and diltiazem alter the movement of calcium ions through the cell membrane, causing vasodilation and lowering blood pressure.

NURSING CONSIDERATIONS

- Monitor blood pressure and pulse, and change the client's position slowly. Hypotension is a common adverse effect.
- Use calcium-channel blockers cautiously with clients who have heart failure.

CLIENT EDUCATION

- Constipation can occur with verapamil, so encourage intake of foods that are high in fiber.
- A decrease or increase in heart rate and atrioventricular (AV) block can occur. Teach the client how to take her pulse and to call the provider if it is irregular or lower than the established rate.
- Instruct the client to avoid grapefruit juice, which potentiates the medication's effects, increases hypotensive effects, and increases the risk of medication toxicity.

ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITORS

ACE inhibitors, such as lisinopril and enalapril, prevent the conversion of angiotensin I to angiotensin II, which prevents vasoconstriction.

NURSING CONSIDERATIONS

- Monitor blood pressure and pulse. Hypotension is a common adverse effect.
- Monitor for evidence of heart failure, such as edema. ACE inhibitors can cause heart and kidney complications.

CLIENT EDUCATION

- Teach the client to report a cough, which is an adverse effect of ACE inhibitors. The client should notify the provider of this adverse effect, as the medication can be discontinued due to its persistent nature and occasional relationship to angioedema (swelling of the tissues in the throat that can progress to a life-threatening obstruction). **Qs**
- Teach the client to report manifestations of heart failure (edema).

Angiotensin-II receptor antagonists

Also called angiotensin-receptor blockers (ARBs), these medications, such as valsartan and losartan, are a good option for clients taking ACE inhibitors who report cough or have hyperkalemia. ARBs do not require a dosage adjustment for older adult clients.

NURSING CONSIDERATIONS: Monitor for manifestations of angioedema or heart failure. Angioedema is a serious, but uncommon adverse effect, and heart failure can result from taking this medication.

CLIENT EDUCATION

- Teach the client to change positions slowly.
- Teach the client to report findings of angioedema (swollen lips or face) or heart failure (edema).
- Reinforce to client to avoid foods that are high in potassium and to have serum potassium levels monitored because ARBs can cause hyperkalemia.

Aldosterone-receptor antagonists

Aldosterone-receptor antagonists, such as eplerenone, block aldosterone action. The blocking effect of eplerenone on aldosterone receptors promotes the retention of potassium and excretion of sodium and water.

NURSING CONSIDERATIONS

- Monitor kidney function, triglycerides, sodium, and potassium levels. The risk of adverse effects increases with deteriorating kidney function. Hypertriglyceridemia, hyponatremia, and hyperkalemia can occur as the dose increases.
- Monitor potassium levels every 2 weeks for the first few months and every 2 months thereafter. The client should avoid taking potassium supplements or potassium-sparing diuretics.

CLIENT EDUCATION

- Teach the client about potential food, medication, and herbal interactions. Grapefruit juice and St. John's wort can increase adverse effects.
- Instruct the client not to take salt substitutes with potassium or other foods that are rich in potassium.

Beta blockers

Beta blockers, such as metoprolol and atenolol, are for clients who have unstable angina or MI. They decrease cardiac output and block the release of renin, subsequently decreasing vasoconstriction of the peripheral vasculature.

NURSING CONSIDERATIONS

- Monitor blood pressure and pulse.
- These medications can mask hypoglycemia in clients who have diabetes mellitus.

CLIENT EDUCATION

- Teach the client that these medications can cause fatigue, weakness, depression, and sexual dysfunction.
- Advise the client not to suddenly stop taking the medication without consulting with the provider. Stopping suddenly can cause rebound hypertension.
- Teach the client manifestations of hypoglycemia that do not include tachycardia, which beta blockers suppress.

Central-alpha₂ agonists

Central-alpha₂ agonists, such as clonidine, reduce peripheral vascular resistance and decrease blood pressure by inhibiting the reuptake of norepinephrine.

NURSING CONSIDERATIONS

- Monitor blood pressure and pulse.
- This medication is not for first-line management of hypertension.

CLIENT EDUCATION: Teach the client that adverse effects include sedation, orthostatic hypotension, and impotence.

Alpha-adrenergic Antagonists

Alpha-adrenergic antagonists, such as prazosin, reduce blood pressure by causing vasodilation.

NURSING CONSIDERATIONS

- Start treatment with a low dose of the medication, usually given at night.
- Monitor blood pressure for 2 hr after initiation of treatment.

CLIENT EDUCATION: Advise the client to rise slowly to prevent postural hypotension. Tell the client to use caution when driving until the effects of the medication are known. **Qs**

CLIENT EDUCATION

- Instruct client to report manifestations of electrolyte imbalance (hyperkalemia, hypokalemia, hyponatremia).
- Express to the client and family the importance of adhering to the medication regimen, even if the client does not have any manifestations of hypertension.
- Provide verbal and written education to the client regarding medications and their adverse effects.
- Ensure that the client has the resources necessary to pay for and obtain prescribed antihypertensive medication.
- Encourage the client to schedule regular provider appointments to monitor hypertension and cardiovascular status.
- Teach the client or a significant other how to monitor blood pressure at home.
- Encourage the client to report findings and adverse effects, as they can be indicative of additional problems. Medications can often be changed to alleviate adverse effects.
- Older adult clients are more likely to experience medication interactions and orthostatic hypotension. 
- Treatment involves the client making lifestyle changes.

Nutrition

- Monitor for hyperkalemia with salt substitute use.
- Consume less than 2.3 g/day of sodium.
- Consume a diet low in fat, saturated fat, and cholesterol.
- Limit alcohol intake to 2 servings per day for men and 1 serving per day for women. A serving of alcohol is equivalent to 1.5 oz liquor, 5 oz wine, or 12 oz beer.
- Dietary approaches to stop hypertension (DASH) are effective in the prevention and treatment of hypertension. 
- The DASH diet is high in fruits, vegetables, and low-fat dairy foods.
- Avoid foods high in sodium and fat (trans and saturated fat).
- Consume foods rich in calcium, and magnesium.
- Clients not taking a potassium-sparing medication should increase potassium consumption.

Weight reduction and maintenance

- Begin slowly and gradually advance the program with the guidance of the provider and physical therapist.
- Exercise at least three times a week in a manner that provides aerobic benefits.

Smoking cessation: Explore smoking cessation options such as nicotine replacement therapy, medications such as bupropion or varenicline, and support groups. 

Stress reduction: Encourage the client to try yoga, massage, hypnosis, or other forms of relaxation.

COMPLICATIONS

Hypertensive crisis

Hypertensive crisis often occurs when clients do not follow the medication therapy regimen.

NURSING ACTIONS

- Recognize manifestations.
 - Severe headache
 - Extremely high blood pressure (generally, systolic blood pressure greater than 240 mm Hg, diastolic greater than 120 mm Hg)
 - Blurred vision, dizziness, and disorientation
 - Epistaxis
- Administer IV antihypertensive therapies, such as nitroprusside, nicardipine, and labetalol.
- Before, during, and after administration of an IV antihypertensive, monitor blood pressure every 5 to 15 min.
- Assess neurological status, such as pupils, level of consciousness, and muscle strength, to monitor for cerebrovascular change.
- Monitor the ECG to assess cardiac status.

Application Exercises

1. A nurse is screening a male client for hypertension. The nurse should identify that which of the following actions by the client increase his risk for hypertension? (Select all that apply.)
 - A. Drinking 8 oz nonfat milk daily
 - B. Eating popcorn at the movie theater
 - C. Walking 1 mile daily at 12 min/mile pace
 - D. Consuming 36 oz beer daily
 - E. Getting a massage once a week
2. A nurse in an urgent care clinic is obtaining a history from a client who has type 2 diabetes mellitus and a recent diagnosis of hypertension. This is the second time in 2 weeks that the client experienced hypoglycemia. Which of the following client data should the nurse report to the provider?
 - A. Takes psyllium daily as a fiber laxative
 - B. Drinks skim milk daily as a bedtime snack
 - C. Takes metoprolol daily after meals
 - D. Drinks grapefruit juice daily with breakfast
3. A nurse is caring for a client who is admitted to the emergency department with a blood pressure of 266/147 mm Hg. The client reports a headache and double vision. The client states that she ran out of her diltiazem 3 days ago, and is unable to purchase more. Which of the following actions should the nurse take first?
 - A. Administer acetaminophen for headache.
 - B. Provide teaching regarding the importance of not abruptly stopping an antihypertensive.
 - C. Obtain IV access and prepare to administer an IV antihypertensive.
 - D. Call social services for a referral for financial assistance in obtaining prescribed medication.
4. A nurse is providing teaching for a client who has a new diagnosis of hypertension and a new prescription for spironolactone 25 mg/day. Which of the following statements by the client indicates an understanding of the teaching?
 - A. "I should eat a lot of fruits and vegetables, especially bananas and potatoes."
 - B. "I will report any changes in heart rate to my provider."
 - C. "I should replace the salt shaker on my table with a salt substitute."
 - D. "I will decrease the dose of this medication when I no longer have headaches and facial redness."
5. A nurse is providing discharge teaching for a client who has a prescription for furosemide 40 mg PO daily. The nurse should instruct the client to take this medication at which of the following times of day?
 - A. Morning
 - B. Immediately after lunch
 - C. Immediately before dinner
 - D. Bedtime

PRACTICE Active Learning Scenario

A nurse is preparing a community education presentation on hypertension. What information should the nurse include in the presentation? Use the ATI Active Learning Template: System Disorder to complete this item.

ALTERATION IN HEALTH (DIAGNOSIS): Describe hypertension to include essential, secondary, and prehypertension.

RISK FACTORS: Describe at least four risk factors each for essential and secondary hypertension.

EXPECTED FINDINGS

- Describe at least three expected subjective data findings for hypertension.
- Describe the objective data stages of hypertension.

Application Exercises Key

1. A. Consuming low-fat beverages and foods lowers the risk for developing hypertension.
B. **CORRECT:** Popcorn at a movie theater contains a large quantity of sodium and fat, which increases the risk for hypertension.
C. Engaging in regular exercise, such as walking, lowers the risk of developing hypertension.
D. **CORRECT:** Consuming more than 24 oz beer per day for a male client increases the risk for hypertension.
E. Stress management activities, such as a massage, lower the risk of hypertension.
NCLEX® Connection: Health Promotion and Maintenance, Health Promotion/Disease Prevention
2. A. Adverse effects of psyllium do not include hypoglycemia.
B. Skim milk increases blood glucose levels and lowers cholesterol.
C. **CORRECT:** Metoprolol can mask the effects of hypoglycemia in clients who have diabetes mellitus.
D. Grapefruit juice increases blood glucose levels.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Adverse Effects/Contraindications/Side Effects/Interactions
3. A. Administering acetaminophen will treat the client's pain, but there is another action that the nurse should take first.
B. Providing teaching regarding medication administration can help promote future compliance with taking medication, but there is another action that the nurse should take first.
C. **CORRECT:** The greatest risk to the client is injury due to a blood pressure of 266/147 mm Hg, which can be life-threatening and should be lowered as soon as possible. Obtaining IV access will permit administration of an IV hypertensive, which will act more rapidly than by the oral route.
D. Calling social services will help connect the client with financial resources, but there is another action that the nurse should take first.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration
4. A. The nurse should teach the client that potatoes and bananas are high in potassium, and can lead to hyperkalemia when taken with a potassium-sparing diuretic such as spironolactone.
B. **CORRECT:** The nurse should teach the client to monitor her heart rate and report any changes to her provider.
C. The nurse should teach the client that salt substitutes are commonly high in potassium and can lead to hyperkalemia when taken with a potassium-sparing diuretic such as spironolactone.
D. The nurse should teach the client to continue taking her medication as prescribed even if she does not have any manifestations of hypertension.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration
5. A. **CORRECT:** The client should take furosemide, a diuretic, in the morning so that the peak action and duration of the medication occurs during waking hours.
B. Taking furosemide at this time increases the likelihood of interruption of the client's sleep due to the need to urinate.
C. Taking furosemide at this time increases the likelihood of interruption of the client's sleep due to the need to urinate.
D. Taking furosemide at this time increases the likelihood of interruption of the client's sleep due to the need to urinate.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration

PRACTICE Answer

Using the ATI Active Learning Template: System Disorder

ALTERATION IN HEALTH (DIAGNOSIS)

- Hypertension is when systolic blood pressure is at or above 140 mm Hg or diastolic blood pressure is at or greater than 90 mm Hg for an adult client or greater than 150/90 mm Hg for a client older than 60.
- Essential (primary) hypertension has no known cause.
- Secondary hypertension is caused by diseases such as kidney disorders, or as an adverse effect of a medication. Treatment occurs by removing the cause.
- Prehypertension is when a client has a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg.

RISK FACTORS

- Primary hypertension: Positive family history, excessive sodium intake, physical inactivity, obesity, high alcohol consumption, African-American, nicotine use, hyperlipidemia, stress, age greater than 60, postmenopausal
- Secondary hypertension: Kidney disease, Cushing's disease, primary aldosteronism (caused by hypertension and hypokalemia), pheochromocytoma (excessive catecholamine release), brain tumors, encephalitis, and medications such as estrogen, steroids, and sympathomimetics

EXPECTED FINDINGS

Subjective data: Few or no manifestations

- Can include headaches, particularly in the morning
- Dizziness, fainting, retinal changes, visual disturbances, nocturia, facial flushing

Objective data stages: Obtain blood pressure readings in both arms with the client sitting and standing:

- Prehypertension: systolic 120 to 139 mm Hg, diastolic 80 to 89 mm Hg
- Stage I: systolic 140 to 159 mm Hg, diastolic 90 to 99 mm Hg
- Stage II: systolic greater than or equal to 160 mm Hg, diastolic greater than or equal to 100 mm Hg

NCLEX® Connection: Physiological Adaptation, Illness Management