

CHAPTER 30 *Vitamins, Minerals,
and Supplements*

Vitamins and minerals have important roles in the body, including the production of red blood cells, building bones, making hormones, regulating body fluid volume, and supporting nerve cell function. Vitamin and mineral deficiencies can increase the risk for health problems, such as anemias, heart disease, cancers, and osteoporosis. Supplements of vitamins and minerals can help prevent multiple health conditions.

Iron preparations

SELECT PROTOTYPE MEDICATIONS

- Oral: Ferrous sulfate
- Parenteral: Iron dextran

OTHER MEDICATIONS

- Oral: Ferrous gluconate, ferrous fumarate
- Parenteral: Ferumoxytol, iron sucrose, sodium–ferric gluconate complex (SFGC)

PURPOSE

EXPECTED PHARMACOLOGICAL ACTION: Iron preparations provide iron needed for RBC development and oxygen transport to cells. During times of increased growth (in growing children or during pregnancy) or when RBCs are in high demand (after blood loss), the need for iron can be greatly increased. Iron is poorly absorbed by the body, so relatively large amounts must be ingested orally to increase Hgb and Hct levels.

THERAPEUTIC USES

- Iron preparations are used to treat and prevent iron-deficiency anemia.
 - **Ferumoxytol** is limited to clients who have chronic kidney disease, regardless if on dialysis or receiving erythropoietin. Ferumoxytol requires only two doses over 3 to 8 days compared with SFGC and iron sucrose, which require 3 to 10 doses over several weeks.
 - **SFGC** is used for clients who are undergoing long-term hemodialysis and are deficient in iron.
 - **Iron sucrose** is used for clients who have chronic kidney disease, are receiving erythropoietin, and are hemodialysis- or peritoneal dialysis-dependent; and clients who have chronic kidney disease, are not receiving erythropoietin, and are not dialysis-dependent.

- Iron preparations are used to prevent iron deficiency anemia for clients who are at an increased risk, such as infants, children, and pregnant women.
- Parenteral forms should only be used in clients who are unable to take oral medications, in which case the IV route is preferred.

COMPLICATIONS*GI distress (nausea, constipation, heartburn)*

NURSING CONSIDERATIONS

- If intolerable, administer medication with food, but this greatly reduces absorption.
- Can need to reduce dosage
- Monitor the client's bowel pattern and intervene as appropriate. This side effect usually resolves with continued use.

Teeth staining (liquid form)

NURSING CONSIDERATIONS: Teach clients to dilute liquid iron with water or juice, drink with a straw, and rinse mouth after swallowing.

Staining of skin and other tissues (IM injections)

NURSING CONSIDERATIONS

- Give IM doses deep IM using Z-track technique.
- Avoid this route if possible.

Anaphylaxis

- Risk with parenteral administration of iron dextran.
- Anaphylaxis is triggered by the dextran in iron dextran, not by the iron.
- Anaphylaxis is minimal with SFGC, iron sucrose, and ferumoxytol.

NURSING CONSIDERATIONS

- IV route is safer than IM.
- Administer a test dose and observe the client closely. No test dose is needed before administering ferumoxytol and iron sucrose.
- Administer slowly, and use manufacturer's recommendation for specific product.
- Be prepared with life-support equipment and epinephrine.

Hypotension

Can progress to circulatory collapse with parenteral administration

NURSING CONSIDERATIONS: Monitor vital signs when administering parenteral iron.

Fatal iron toxicity in children

Can occur when an overdose of iron (2 to 10 g) is ingested

NURSING CONSIDERATIONS

- Manifestations of toxicity include severe GI symptoms, shock, acidosis, and liver and heart failure. The chelating agent deferoxamine, given parenterally, is used to treat toxicity.
- Avoid using oral and parenteral iron concurrently.

CONTRAINDICATIONS/PRECAUTIONS

- Contraindicated for clients who have previous hypersensitivity to iron, anemias other than iron-deficiency anemia.
- Oral preparations should be used with caution in clients who have peptic ulcer disease, regional enteritis, ulcerative colitis, and severe liver disease.

Concurrent administration of antacids or tetracyclines reduces absorption of iron.

NURSING CONSIDERATIONS

- Separate use by at least 2 hr.
- Vitamin C increases absorption, but also increases incidence of GI complications.

Caffeine and dairy products can interfere with absorption.

NURSING CONSIDERATIONS: Avoid vitamin C, caffeine, and dairy intake when taking medication.

Food reduces absorption but reduces gastric distress.

NURSING CONSIDERATIONS: Take with food at the start of therapy if gastric distress occurs.

NURSING ADMINISTRATION

NURSING CARE

- Instruct clients to take iron on an empty stomach, such as 1 hr before meals, as stomach acid increases absorption.
- Instruct clients to take with food if GI adverse effects occur. This might increase adherence to therapy even though absorption is also decreased.
- Instruct clients to space doses at approximately equal intervals throughout day to most efficiently increase red blood cell production.
- Inform clients to anticipate a harmless dark green or black color of stool.
- Teach clients to dilute liquid iron with water or juice, drink with a straw, and rinse the mouth after swallowing.
- Instruct clients to increase water and fiber intake (unless contraindicated) and to maintain an exercise program to counter the constipation effects.
- Advise clients that therapy can last 1 to 2 months. Usually, dietary intake will be sufficient after Hgb has returned to a therapeutic level.
- Encourage concurrent intake of appropriate quantities of foods high in iron (liver, egg yolks, muscle meats, yeast, grains, green leafy vegetables).

NURSING EVALUATION OF MEDICATION EFFECTIVENESS

Depending on therapeutic intent, effectiveness is evidenced by the following.

- Increased reticulocyte count is expected at least 1 week after beginning iron therapy.
- Increase in hemoglobin of 2 g/dL is expected 1 month after beginning therapy.
- Fatigue and pallor (skin, mucous membranes) should subside, and the client reports increased energy level.

Vitamin B₁₂/Cyanocobalamin

SELECT PROTOTYPE MEDICATION: Vitamin B₁₂

OTHER MEDICATIONS: Intranasal cyanocobalamin

PURPOSE

EXPECTED PHARMACOLOGICAL ACTION

- Vitamin B₁₂ is necessary to convert folic acid from its inactive form to its active form. All cells rely on folic acid for DNA production.
- Vitamin B₁₂ deficiency can result in megaloblastic (macrocytic) anemia and cause dysrhythmias and heart failure if not corrected. Vitamin B₁₂ is administered to prevent or correct deficiency. Damage to rapidly multiplying cells can affect the skin and mucous membranes, causing GI disturbances. Neurologic damage, which includes numbness and tingling of extremities and CNS damage caused by demyelination of neurons, can result from deficiency of this vitamin.
- Vitamin B₁₂ deficiency affects all blood cells produced in the bone marrow.
 - Loss of erythrocytes leads to heart failure, cerebral vascular insufficiency, and hypoxia.
 - Loss of leukocytes leads to infections.
 - Loss of thrombocytes leads to bleeding and hemorrhage.
- Loss of intrinsic factor within the cells of the stomach causes an inability to absorb vitamin B₁₂, making it necessary to administer parenteral or intranasal vitamin B₁₂ or high doses of oral B₁₂ for the rest of the client's life.

THERAPEUTIC USES

- Treatment of vitamin B₁₂ deficiency
- Megaloblastic (macrocytic) anemia related to vitamin B₁₂ deficiency

COMPLICATIONS

Hypokalemia

Secondary to the increased RBC production effects of vitamin B₁₂

NURSING CONSIDERATIONS

- Monitor potassium levels during the start of treatment.
- Observe clients for manifestations of potassium deficiency (muscle weakness, irregular cardiac rhythm).
- Clients might require potassium supplements.

CONTRAINDICATIONS/PRECAUTIONS

- Vitamin B₁₂ deficiency should not be treated only with folic acid. Treatment with folic acid alone can reverse the hematologic effects of the deficiency but can allow neurologic damage to progress. If folic acid is used for a client who has vitamin B₁₂ deficiency, ensure that dosage of vitamin B₁₂ is adequate.
- Oral and intranasal cyanocobalamin are Pregnancy Risk Category A.
- Parenteral cyanocobalamin is Pregnancy Risk Category C.

INTERACTIONS

Masks manifestations of vitamin B₁₂ deficiency with concurrent administration of folic acid

NURSING CONSIDERATIONS: Make sure that clients receive adequate doses of vitamin B₁₂ when using folic acid.

NURSING ADMINISTRATION

NURSING CARE

- Obtain baseline vitamin B₁₂, Hgb, Hct, RBC, reticulocyte counts, and folate levels. Monitor periodically.
- Monitor for manifestations of vitamin B₁₂ deficiency, such as beefy red tongue, pallor, and neuropathy.
- Cyanocobalamin is administered intranasally, orally, IM, or subcutaneously. Injections are painful and usually reserved for clients who have significant reduced ability to absorb vitamin B₁₂, such as lack of intrinsic factor (pernicious anemia), enteritis, and partial removal of the stomach.
- Clients who have malabsorption syndrome can use intranasal or parenteral preparations.
- Intranasal cyanocobalamin should be administered 1 hr before or after eating hot foods, which can cause the medication to be removed from nasal passages without being absorbed, because of increased nasal secretions.
- Clients who have irreversible malabsorption syndrome (parietal cell atrophy or total gastrectomy) will need lifelong treatment, usually parenterally. If oral therapy is used, doses must be very high.
 - Encourage concurrent intake of quantities of foods high in vitamin B₁₂, such as dairy products.
 - Perform a Schilling test to determine vitamin B₁₂ absorption in the gastrointestinal tract.
 - Measurement of plasma B₁₂ levels helps determine the need for therapy.
 - Advise clients to adhere to prescribed laboratory tests. Monitor blood counts and vitamin B₁₂ levels every 3 to 6 months.

NURSING EVALUATION OF MEDICATION EFFECTIVENESS

Depending on therapeutic intent, effectiveness can be evidenced by the following.

- Disappearance of megaloblasts (in 2 to 3 weeks)
- Increased reticulocyte count
- Increase in hematocrit
- Improvement of neurologic injury, such as absence of tingling sensation of hands and feet and numbness of extremities. Improvement can take months, and some clients never attain full recovery.

Folic acid

SELECT PROTOTYPE MEDICATION: Folic acid

PURPOSE

EXPECTED PHARMACOLOGICAL ACTION: Folic acid is essential in the production of DNA and erythropoiesis (RBC, WBC, and platelets).

THERAPEUTIC USES

- Treatment of megaloblastic (macrocytic) anemia secondary to folic acid deficiency
- Prevention of neural tube defects that can occur early during pregnancy (thus needed for all women of child-bearing age who might become pregnant)
- Treatment of malabsorption syndrome, such as sprue
- Supplement for alcohol use disorder (due to poor dietary intake of folic acid and injury to the liver)

CONTRAINDICATIONS/PRECAUTIONS

Avoid indiscriminate use of folic acid to reduce the risk of masking manifestations of vitamin B₁₂ deficiency.

INTERACTIONS

Folic acid levels are decreased by methotrexate and sulfonamides.

NURSING CONSIDERATIONS: Avoid concurrent use of these medications.

Folic acid can decrease phenytoin serum levels because of increased metabolism.

NURSING CONSIDERATIONS: Monitor serum phenytoin levels.

NURSING ADMINISTRATION

NURSING CARE

- Assess for manifestations of megaloblastic anemia (pallor, easy fatigability, palpitations, paresthesias of hands or feet).
- Obtain baseline folic acid, Hgb and Hct levels, and RBC and reticulocyte counts. Monitor periodically.
- Advise clients who have folic acid deficiency to concurrently increase intake of food sources of folic acid, such as liver, green leafy vegetables, citrus fruits, and dried peas and beans. Monitor for risk factors indicating that folic acid therapy is needed, such as heavy alcohol use and child-bearing age.

NURSING EVALUATION OF MEDICATION EFFECTIVENESS

Depending on therapeutic intent, effectiveness is evidenced by the following.

- Folate level within expected reference range
- Return of RBC, reticulocyte count, and Hgb and Hct to levels within expected reference range
- Improvement of anemia findings such as absence of pallor, dyspnea, easy fatigability
- Absence of neural tube defects in newborns

Potassium supplements

SELECT PROTOTYPE MEDICATION: Potassium chloride

OTHER MEDICATIONS

- Potassium gluconate
- Potassium phosphate
- Potassium bicarbonate

PURPOSE

EXPECTED PHARMACOLOGICAL ACTION

Potassium is essential for conducting nerve impulses, maintaining electrical excitability of muscle, and regulation of acid/base balance.

THERAPEUTIC USES

- Treating hypokalemia (potassium less than 3.5 mEq/L).
- For clients receiving diuretics resulting in potassium loss, such as furosemide
- For clients who have potassium loss due to excessive or prolonged vomiting, diarrhea, excessive use of laxatives, intestinal drainage, and GI fistula

COMPLICATIONS

Local GI ulceration and GI distress

Nausea, vomiting, diarrhea, abdominal discomfort, and esophagitis with oral administration

CLIENT EDUCATION

- Instruct clients to take the medication with meals or at least 8 oz of water to minimize GI discomfort and prevent ulceration.
- Teach clients not to dissolve the tablet in the mouth because oral ulceration will develop.

Hyperkalemia (potassium more than 5.0 mEq/L)

NURSING CONSIDERATIONS

- Hyperkalemia rarely occurs with oral administration.
- Monitor clients receiving IV potassium for manifestations of hyperkalemia, such as bradycardia, ECG changes, vomiting, confusion, anxiety, dyspnea, weakness, numbness, and tingling.
- Severe hyperkalemia can require treatment, such as calcium salt, glucose and insulin, sodium bicarbonate, sodium polystyrene sulfonate, peritoneal dialysis, or hemodialysis.

CONTRAINDICATIONS/PRECAUTIONS

Contraindicated for clients who have severe kidney disease or hypoaldosteronism

INTERACTIONS

Concurrent use of potassium-sparing diuretics, such as spironolactone, or ACE inhibitors (lisinopril) increases the risk of hyperkalemia.

NURSING CONSIDERATIONS: Avoid concurrent use.

NURSING ADMINISTRATION

ORAL FORMULATIONS

- Mix powdered formulations in at least 120 mL (4 oz) of liquid.
- Advise clients to take potassium chloride with a meal or at least 8 oz of water to reduce the risk of adverse GI effects.
- Instruct clients not to crush extended-release tablets.
- Instruct clients to notify the provider if they have difficulty swallowing the pills. Medication is supplied as a powder or a sustained-release tablet that is easier to tolerate.

IV ADMINISTRATION

- Never administer IV bolus. Rapid IV infusion can result in fatal hyperkalemia. **Qs**
- Use an IV infusion pump to control the infusion rate.
- Dilute potassium and give no more than 40 mEq/L of IV solution to prevent vein irritation.
- Infuse slowly, generally no faster than 10 mEq/hr.
- Cardiac monitoring is indicated for serum potassium levels outside of expected reference ranges. ECG changes, such as prolonged PR interval and peaked T-waves, can indicate potassium toxicity.
- Infuse potassium through a large bore needle. Assess the IV site for local irritation, phlebitis, and infiltration. Discontinue the IV immediately if infiltration occurs.
- Monitor I&O to ensure an adequate urine output of at least 30 mL/hr.

NURSING EVALUATION OF MEDICATION EFFECTIVENESS

Depending on therapeutic intent, effectiveness is evidenced by serum potassium level within the expected reference range (3.5 to 5.0 mEq/L).

Magnesium sulfate

SELECT PROTOTYPE MEDICATION

- Parenteral: Magnesium sulfate
- Oral: Magnesium hydroxide, magnesium oxide, magnesium citrate

Magnesium hydroxide and magnesium oxide act as antacids when administered in a low dose, and all three act as laxatives.

PURPOSE

EXPECTED PHARMACOLOGICAL ACTION: Magnesium activates many intracellular enzymes, binds the messenger RNA to ribosomes, and plays a role in regulating skeletal muscle contractility and blood coagulation.

THERAPEUTIC USES

- Magnesium supplements are used for clients who have hypomagnesemia (magnesium level less than 1.3 mEq/L).
- Oral preparations of magnesium sulfate are used to prevent or treat low magnesium levels and as laxatives.
- Parenteral magnesium is used for clients who have severe hypomagnesemia.
- IV magnesium sulfate is used to stop preterm labor and as an anticonvulsant during labor and delivery.

COMPLICATIONS

Muscle weakness, flaccid paralysis, painful muscle contractions, suppression of AV conduction through the heart, respiratory depression

NURSING CONSIDERATIONS

- IV administration requires careful monitoring of cardiac and neuromuscular status.
- Monitor serum magnesium levels.
- Avoid administering with neuromuscular blocking agents, which can potentiate respiratory depression and apnea.
- Have IV calcium available to reverse the effects of magnesium. **Qs**

Diarrhea

NURSING CONSIDERATIONS

- Monitor electrolyte levels for electrolyte loss from diarrhea.
- Monitor I&O, and observe for manifestations of dehydration.

CONTRAINDICATIONS/PRECAUTIONS

- Magnesium is Pregnancy Risk Category A.
- Contraindicated in clients who have AV block, rectal bleeding, nausea, vomiting, and abdominal pain.
- Use cautiously with clients who have renal and/or cardiac disease.

INTERACTIONS

- Magnesium sulfate can decrease the absorption of tetracyclines and digoxin.
- Monitor the therapeutic effect to determine if absorption has been affected.

NURSING ADMINISTRATION

NURSING CARE

- Monitor serum magnesium, calcium, and phosphorus.
- Monitor blood pressure, heart rate, and respiratory rate when given intravenously.
- Assess for depressed or absent deep tendon reflexes as a manifestation of toxicity.
- Calcium gluconate is given for magnesium sulfate toxicity. Always have an injectable form of calcium gluconate available when administering magnesium sulfate by IV. **Qs**
- Teach clients about dietary sources of magnesium (whole-grain cereals, nuts, legumes, green leafy vegetables, bananas).

NURSING EVALUATION OF MEDICATION EFFECTIVENESS

Depending on therapeutic intent, effectiveness is evidenced by serum magnesium levels within expected reference range (1.3 to 2.1 mEq/L).

Herbal supplements

- Herbal supplements are widely used but less tested and regulated than conventional medications. Dosages are less precise than for more regulated medications. Because different formulations are not standardized, it can be difficult to know which preparations can provide therapeutic effects.
- Supplements are regulated by the FDA for manufacturing devoid of impurities, and for accurate labeling.

Aloe, aloe vera

- Acts as a topical anti-inflammatory, analgesic, and cathartic
- Soothes pain
- Heals burns
- Softens skin
- Laxative

ADVERSE EFFECTS AND PRECAUTIONS

- Skin preparations: Possible hypersensitivity
- Laxative: Possible fluid and electrolyte imbalances
- Increases menstrual flow when taken during menses
- Avoid in clients who have kidney disorders.

INTERACTIONS: Interacts with digoxin, diuretics, corticosteroids and antidysrhythmics

NURSING ADMINISTRATION: Teach clients to recognize manifestations of fluid and electrolyte imbalance if using as a laxative.

Black cohosh

- Acts as an estrogen substitute
- Mechanism of action is unknown
- Treats manifestations of menopause

ADVERSE EFFECTS AND PRECAUTIONS

- GI distress, lightheadedness, headache, rash, weight gain
- Avoid taking during pregnancy, especially the first two trimesters of pregnancy.
- Limit use to no longer than 6 months due to lack of information regarding long-term effects.

INTERACTIONS

- Increases effects of antihypertensive medications
- Can increase effect of estrogen medications
- Increases hypoglycemia in clients taking insulin or other medications for diabetes

NURSING ADMINISTRATION: Question clients who take antihypertensives, insulin, or hypoglycemic agents, or clients who might be pregnant about possible use of black cohosh.

Echinacea

- Stimulates the immune system
- Decreases inflammation
- Topically heals skin disorders, wounds, and burns
- Possibly treats viruses (common cold, herpes simplex)
- Used to increase T-lymphocyte, tumor necrosis factor, and interferon production

ADVERSE EFFECTS

- Bitter taste
- Mild GI symptoms or fever can occur.
- Allergic reactions, especially in clients who are allergic to plants such as ragweed or others in the daisy family

INTERACTIONS: With chronic use (more than 6 months), echinacea can decrease positive effects of medications for tuberculosis, HIV, or cancer.

NURSING ADMINISTRATION

- Echinacea is available in many forms, including dried roots, plants, extracts, and teas.
- Question clients who have tuberculosis, cancer, HIV, lupus erythematosus, and rheumatoid arthritis about concurrent use. Advise these clients to talk to the provider.

Feverfew

- Can block platelet aggregation
- Can block a factor that causes migraines
- Can decrease the number and severity of migraine headaches (does not treat an existing migraine)

ADVERSE EFFECTS AND PRECAUTIONS

- Mild GI symptoms
- Post-feverfew syndrome can occur, causing agitation, tiredness, inability to sleep, headache, and joint discomfort.
- Can cause allergic reactions in clients allergic to ragweed or echinacea

INTERACTIONS

- Can cause increased risk of bleeding in clients taking NSAIDs, heparin, and warfarin
- Discontinue 2 weeks before elective surgery.

NURSING ADMINISTRATION: Question clients about concurrent use of NSAIDs, heparin, and warfarin.

Garlic

- When crushed, forms the enzyme allicin
- Blocks LDL cholesterol and raises HDL cholesterol; lowers triglycerides
- Suppresses platelet aggregation and disrupts coagulation
- Acts as a vasodilator (can lower blood pressure)

ADVERSE EFFECTS: GI symptoms

INTERACTIONS

- Due to antiplatelet qualities, can increase risk of bleeding in clients taking NSAIDs, warfarin, and heparin
- Decreases levels of saquinavir (a medication for HIV treatment) and cyclosporine

NURSING ADMINISTRATION

- Question clients about concurrent use of NSAIDs, heparin, and warfarin.
- Have clients who are taking antiplatelet or anticoagulant medication, cyclosporine, or saquinavir contact their provider.

Ginger root

- Relieves vertigo and nausea
- Increases intestinal motility
- Increases gastric mucous production
- Decreases GI spasms
- Produces an anti-inflammatory effect
- Suppresses platelet aggregation
- Used to treat morning sickness, motion sickness, nausea from surgery
- Can decrease pain and stiffness of rheumatoid arthritis

ADVERSE EFFECTS AND PRECAUTIONS

- Use cautiously in clients who are pregnant because high doses can cause uterine contractions.
- Adverse effects are unknown, with potential CNS depression and cardiac dysrhythmias with very large overdose.

INTERACTIONS

- Interacts with medications that interfere with coagulation (NSAIDs, warfarin, and heparin).
- Can increase hypoglycemic effects of diabetes medications

NURSING ADMINISTRATION

- Question clients about concurrent use with NSAIDs, heparin, and warfarin.
- Monitor for hypoglycemia if the client takes insulin or other medication for diabetes.

Ginkgo biloba

- Promotes vasodilation: Decreases leg pain caused from occlusive arterial disorders
- Decreases platelet aggregation: Can decrease risk of thrombosis
- Decreases bronchospasm
- Increases blood flow to the brain: Thought to improve memory (dementia, Alzheimer's disease), but studies do not indicate effectiveness

ADVERSE EFFECTS AND PRECAUTIONS

- Mild GI upset, headache, lightheadedness, which can be decreased by reducing dose
- Should be taken with caution in clients at risk for seizures

INTERACTIONS

- Can interact with medications that lower the seizure threshold, such as antihistamines, antidepressants, and antipsychotics
- Can interfere with coagulation

NURSING ADMINISTRATION

- Question clients regarding history of antidepressant use (imipramine), which causes a decrease in seizure threshold.
- Question clients about concurrent use with NSAIDs, heparin, and warfarin.

Glucosamine

- Stimulates cells to make cartilage and synovial fluid
- Suppresses inflammation of the joints and cartilage degradation
- Treats osteoarthritis of the knee, hip, and wrist

ADVERSE EFFECTS AND PRECAUTIONS

- Mild GI upset (nausea, heartburn)
- Use with caution with shellfish allergy.

INTERACTIONS: Use caution if taking antiplatelet or anticoagulant medication.

NURSING ADMINISTRATION: Question clients about concurrent use with NSAIDs, heparin, and warfarin.

Kava

! Causes liver injury Qs

- Possibly acts on gamma-aminobutyric acid (GABA) receptors in the CNS
- Promotes sleep
- Decreases anxiety
- Promotes muscle relaxation without affecting concentration

ADVERSE EFFECTS AND PRECAUTIONS

- Chronic use causes dry, flaky skin and jaundice.
- Chronic use and large doses can cause liver damage, including severe liver failure.

INTERACTIONS: Can cause sedation when taken concurrently with CNS depressants.

NURSING ADMINISTRATION

- Question clients taking any CNS depressant, including alcohol, about use of kava.
- Ask clients who have any liver condition about concurrent use.

Ma huang

! Can cause hypertension, tachycardia, stroke, myocardial infarction. Qs

- Stimulates the CNS
- Suppresses the appetite
- Used for weight loss
- Constricts arterioles: Increases heart rate and blood pressure
- Bronchodilator: Treats colds, influenza, and allergies

ADVERSE EFFECTS AND PRECAUTIONS

- Because it contains ephedrine, ma huang can stimulate the cardiovascular system. At high doses, it can cause death from hypertension and dysrhythmias.
- Stimulation of CNS can cause euphoria. In high doses, it can cause psychosis.

INTERACTIONS

- Interacts with CNS stimulants to potentiate their effect
- Can cause severe hypertension when taken with monoamine oxidase inhibitor antidepressants
- Interacts with antihypertensive medications, decreasing effects

NURSING ADMINISTRATION

- Question clients carefully about other medications.
- Products that include more than 10 mg/dose are forbidden to be sold in the U.S.

St. John's wort

- Affects serotonin, producing antidepressant effects: Used for mild depression
- Used orally as an analgesic to relieve pain and inflammation
- Applied topically for infection

ADVERSE EFFECTS

- Mild adverse effects, including dry mouth, lightheadedness, constipation, GI symptoms
- Skin rash when exposed to sunlight

INTERACTIONS

- Can cause serotonin syndrome when combined with other antidepressants, amphetamine, and cocaine
- Decreases effectiveness of oral contraceptives, cyclosporine, warfarin, digoxin, calcium-channel blockers, steroids, HIV protease inhibitors, and some anticancer medications

NURSING ADMINISTRATION

- Question clients taking any of the medications with which this substance interacts about concurrent use.
- Encourage clients using St. John's wort to prevent prolonged sun exposure and use sunscreen.

Saw palmetto

Can decrease prostate symptoms of hyperplasia

ADVERSE EFFECTS AND PRECAUTIONS: Few adverse effects; can cause mild GI effects

INTERACTIONS

- Possible additive effects with finasteride
- Can interact with antiplatelet and anticoagulant medications
- Pregnancy Risk Category X 

NURSING ADMINISTRATION

- Question clients about use before prostate-specific antigen tests.
- Question clients about concurrent use with aspirin, heparin, and warfarin.

Valerian

- Increases GABA to prevent insomnia (similar to benzodiazepines)
- Reduces anxiety-related restlessness
- Drowsiness effect increases over time

ADVERSE EFFECTS AND PRECAUTIONS

- Can cause drowsiness, lightheadedness, depression
- Risk of physical dependence

PRECAUTION

- Clients who have mental health disorders should use with caution.
- Should be avoided by women who are pregnant or lactating.

INTERACTIONS: It is not known if valerian potentiates effects of CNS depressants

NURSING ADMINISTRATION: Clients taking valerian should be warned about the possibility of drowsiness when operating motor vehicles and other equipment.

Application Exercises

1. A nurse is teaching a client who has anemia and a new prescription for a liquid iron supplement. Which of the following information should the nurse include in the teaching? (Select all that apply.)
 - A. "Add foods that are high in fiber to your diet."
 - B. "Rinse your mouth after taking the medication."
 - C. "Expect stools to be green or black in color."
 - D. "Take the medication with a glass of milk."
 - E. "Add red meat to your diet."
2. A nurse is caring for a client who has increased liver enzymes and is taking herbal supplements. Which of the following herbal supplements should the nurse report to the provider?
 - A. Glucosamine
 - B. Saw palmetto
 - C. Kava
 - D. St. John's wort
3. A nurse is evaluating a group of clients at a health fair to identify the need for folic acid therapy. Which of the following clients require folic acid therapy? (Select all that apply.)
 - A. 12-year-old child who has iron deficiency anemia
 - B. 24-year-old female who has no health problems
 - C. 44-year-old male who has hypertension
 - D. 55-year-old female who has alcohol use disorder
 - E. 35-year-old male who has type 2 diabetes mellitus
4. A nurse is preparing to administer potassium chloride IV to a client who has hypokalemia. Which of the following actions should the nurse take? (Select all that apply.)
 - A. Infuse medication through a large-bore needle.
 - B. Monitor urine output to ensure at least 20 mL/hr.
 - C. Administer medication via direct IV bolus.
 - D. Implement cardiac monitoring.
 - E. Administer the infusion using an IV pump.
5. A nurse is caring for a client who requests information on the use of feverfew. Which of the following responses should the nurse make?
 - A. "It is used to treat skin infections."
 - B. "It can decrease the frequency of migraine headaches."
 - C. "It can lessen the nasal congestion in the common cold."
 - D. "It can relieve nausea of morning sickness during pregnancy."
6. A nurse is completing an assessment of a client's current medications. The client states she also takes ginkgo biloba. Which of the following medications is contraindicated for a client taking ginkgo biloba?
 - A. Acetaminophen
 - B. Warfarin
 - C. Digoxin
 - D. Lisinopril

PRACTICE Active Learning Scenario

A nurse is educating a client about a new prescription for cyanocobalamin. What should the nurse include in the teaching? Use the ATI Active Learning Template: Medication to complete this item.

EXPECTED PHARMACOLOGICAL ACTION

CLIENT EDUCATION: Describe four teaching points for the client.

EVALUATION OF MEDICATION EFFECTIVENESS: Describe two nursing interventions.

Application Exercises Key

1. A. **CORRECT:** Foods high in fiber can prevent constipation, which can occur when taking iron supplements.
B. **CORRECT:** Iron supplements can stain teeth when taken in a liquid form. The client should rinse orally after taking the medication.
C. **CORRECT:** Dark green or black stools can occur when taking iron supplements. The client should anticipate this effect.
D. Dairy products and caffeine can decrease the absorption of iron supplements. Iron supplements are maximally absorbed when taken on an empty stomach or 1 hr before meals.
E. **CORRECT:** Red meats are high in iron and recommended for a client to improve anemia when taken concurrently with iron supplements.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration
2. A. Glucosamine can increase bleeding and should be used with caution in clients who are taking antiplatelet medications or anticoagulants.
B. Saw palmetto can cause mild GI effects, and should be used with caution in clients who are taking antiplatelet medications or anticoagulants.
C. **CORRECT:** Chronic use or high doses of kava can cause liver damage, including severe liver failure.
D. Garlic can cause GI symptoms and should be used with caution in clients who are taking antiplatelet medications or anticoagulants.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Adverse Effects/Contraindications/Side Effects/Interactions
3. A. The client who has iron deficiency anemia requires treatment with iron supplements.
B. **CORRECT:** The female client of childbearing age should take folic acid to prevent neural tube defects in the fetus.
C. The client who has hypertension requires treatment with diet, exercise, and antihypertensive medication.
D. **CORRECT:** The client who has alcohol use disorder can require folic acid therapy. Excess alcohol consumption leads to poor dietary intake of folic acid and injury to the liver.
E. The client who has type 2 diabetes mellitus requires treatment with diet, exercise, and hyperglycemic medication.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Expected Actions/Outcomes
4. A. **CORRECT:** Infuse potassium through a large-bore needle to prevent vein irritation, phlebitis, and infiltration.
B. The nurse monitors urine output to ensure at least 30 mL/hr for adequate kidney function.
C. Administer IV potassium slowly, no faster than 10 mEq/hr. Rapid administration can result in fatal hyperkalemia.
D. **CORRECT:** Implement cardiac monitoring to detect cardiac dysrhythmias in a client receiving IV potassium.
E. **CORRECT:** Administer IV potassium using an infusion pump to prevent fatal hyperkalemia due to a rapid infusion rate.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Parenteral/Intravenous Therapies
5. A. Aloe is used to treat tissue injury.
B. **CORRECT:** Feverfew is used to decrease the frequency of migraine headaches, but it has not been proven to relieve an existing migraine headache.
C. Echinacea is used to can relieve manifestations of the common cold.
D. Ginger root is used to relieve nausea caused from morning sickness during pregnancy.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration
6. A. Aspirin should be used with caution in clients taking ginkgo biloba because ginkgo biloba can suppress coagulation.
B. **CORRECT:** Warfarin is contraindicated for a client taking ginkgo biloba because ginkgo biloba can suppress coagulation and increase the risk of bleeding or hemorrhage.
C. Decongestants are contraindicated for a client taking ginkgo biloba. Digoxin is not contraindicated for a client taking ginkgo biloba.
D. Antipsychotic medications are contraindicated for a client taking ginkgo biloba. Lisinopril is not contraindicated for a client taking ginkgo biloba.
NCLEX® Connection: Pharmacological and Parenteral Therapies, Adverse Effects/Contraindications/Side Effects/Interactions

PRACTICE Answer

Using the ATI Active Learning Template: Medication

EXPECTED PHARMACOLOGICAL ACTION: Cyanocobalamin converts folic acid from an inactive form to an active form. It corrects megaloblastic anemia related to a deficiency of vitamin B₁₂.

CLIENT EDUCATION

- Review manifestations of hypokalemia.
- Discuss the use of potassium supplements, if prescribed.
- Discuss dietary sources of potassium.
- Encourage foods high in vitamin B₁₂.
- Administer intranasal cyanocobalamin 1 hr before or after eating hot foods when nasal secretions are decreased.
- Periodic laboratory testing of Hgb, Hct, RBC, reticulocyte count, and folate levels is advised.

EVALUATION OF MEDICATION EFFECTIVENESS

- Review laboratory values for increased reticulocyte count and macrocytes and Hgb and Hct levels within the expected reference range.
- Assess for improvement of neurologic manifestations (numbness, tingling of hands and feet).

NCLEX® Connection: Pharmacological and Parenteral Therapies, Medication Administration