Wolters Kluwer

When you have to be right

Introduction to Clinical Pharmacology

Chapter 14
Nonopioid Analgesics: Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) and Migraine Headache Medications

Learning Objectives

1. Discuss the importance of good pain assessment.
2. Compare and contrast standardized methods to assess pain in different client populations.
3. Explain the uses, general drug actions, common adverse reactions, contraindications, precautions, and interactions of the nonsteroidal anti-inflammatory drugs (NSAIDs).
4. Describe the types, general drug actions, common adverse reactions, contraindications, precautions, and interactions of drugs used to treat migraine headaches.
5. Distinguish important preadministration and ongoing assessment activities the nurse should perform on the client taking an NSAID.
6. List nursing diagnoses particular to a client taking an NSAID.
7. Examine the ways to promote an optimal response to therapy, how to manage common adverse reactions, and important points to keep in mind when educating clients about the use of NSAIDs.

Pain Assessment #1

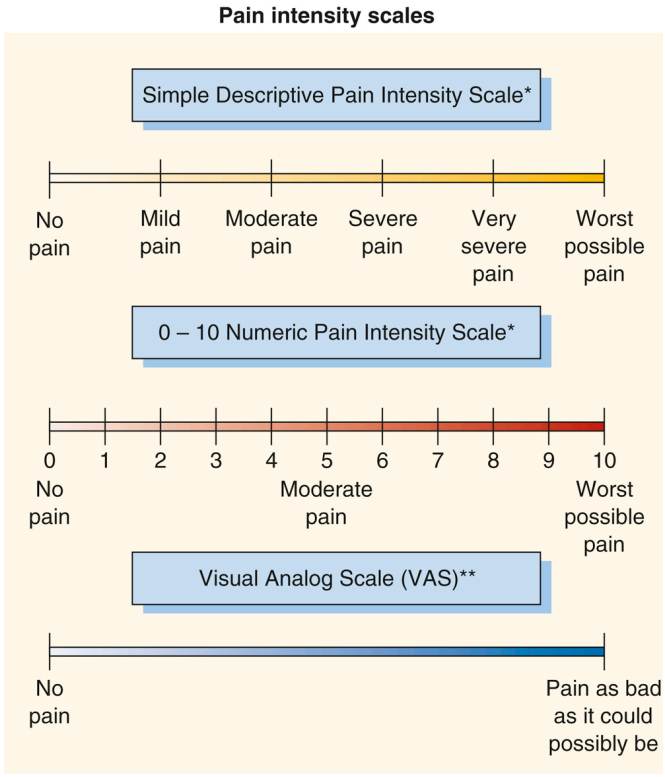
- A key component to good pain management is the pain assessment.
- Pain is subjective.
- The location and intensity of the pain should be assessed—pain can be localized or referred.
- Pain is often referred to as the "5th vital sign."

Pain Assessment #2

- Sample Assessment Questions
  - Does the pain keep you awake at night? Prevent you from falling asleep or staying asleep?
  - What makes your pain worse? What makes it better?
  - Can you describe what your pain feels like? Sharp, stabbing, burning, or throbbing.
  - Does the pain affect your mood? Are you depressed? Irritable? Anxious?
  - What over-the-counter medications or herbal remedies have you used for the pain?
  - Does the pain affect your activity level? Are you able to walk? Perform self-care activities?

Pain Assessment #3

- Pain Assessment Tools



* If used as a graphic rating scale, a 10-cm baseline is recommended.
** A 10-cm baseline is recommended for VAS scales.

Populations at Higher Risk for Poor Pain Assessment

- Infants and children
- Older adults, especially those cognitively impaired
- Developmentally disabled children and adults
- Those with communication problems such as limited English proficiency or limited health literacy
- Those unable to communicate due to the illness or treatment process

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Actions #1

- Analgesic and antipyretic
- Exact mechanism of action unknown; thought to work by inhibiting action of enzyme cyclooxygenase responsible for prostaglandin synthesis; NSAIDs inhibit two related enzymes
- Thought to inhibit prostaglandin synthesis by blocking the action of cyclooxygenase: Enzyme controls the process of inflammation

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Actions #2

- NSAIDs inhibit the activity of two cyclooxygenase enzymes:
  - cyclooxygenase-1 (COX-1): Enzyme helps to maintain the stomach lining
  - cyclooxygenase-2 (COX-2): Enzyme triggers pain and inflammation

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Actions #3

- Ibuprofen and naproxen: block COX-2, produces pain relief; inhibit COX-1, causes adverse reactions including unwanted GI reactions such as stomach irritation and ulcers
- Celecoxib: inhibits only COX-2; less potential for GI adverse reactions

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Uses

- Mild to moderate pain
- Primary dysmenorrhea
- Fever reduction
- Pain associated with musculoskeletal disorders (osteoarthritis and rheumatoid arthritis)

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #1

- Gastrointestinal System Reactions:
  - Nausea, vomiting, dyspepsia
  - Anorexia, dry mouth
  - Diarrhea, constipation
  - Epigastric pain, indigestion, abdominal distress or discomfort, bloating
  - Intestinal ulceration, stomatitis
  - Jaundice

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #2

- Central Nervous System Reactions:
  - Dizziness, anxiety, lightheadedness, vertigo
  - Headache
  - Drowsiness, somnolence, insomnia
  - Confusion, depression
  - Stroke, psychic disturbances

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #3

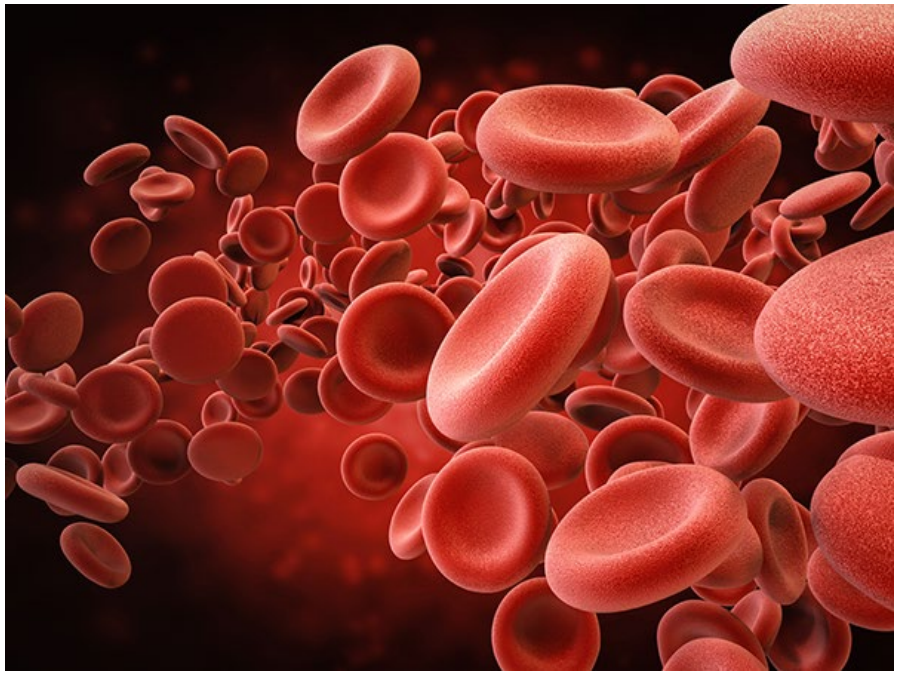
- Cardiovascular System Reactions:
  - Hypotension or hypertension
  - Congestive heart failure
  - Cardiac arrhythmias
  - Myocardial infarction

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #4

- Renal System Reactions:
  - Polyuria, dysuria, oliguria
  - Hematuria, cystitis
  - Elevated blood urea nitrogen
  - Acute renal failure in those with impaired renal function

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #5

- Hematologic System Reactions:
  - Pancytopenia
  - Thrombocytopenia
  - Neutropenia
  - Eosinophilia
  - Leukopenia
  - Agranulocytosis
  - Aplastic anemia

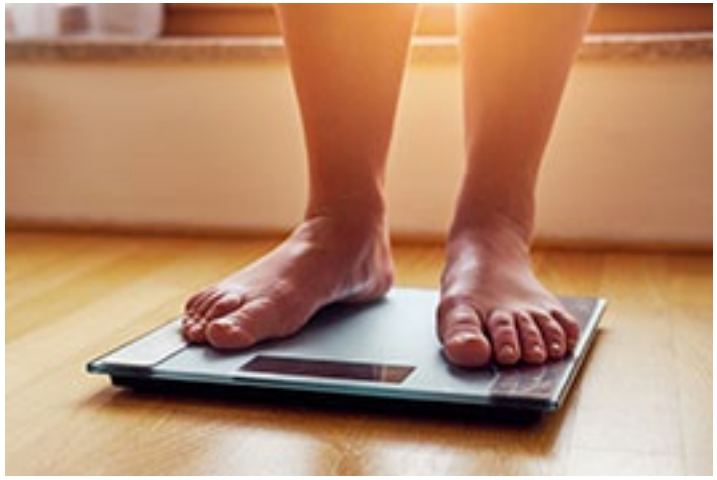


Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #6

- Integumentary System Reactions:
  - Rash, erythema, irritation, skin eruptions
  - Ecchymosis, purpura
  - Exfoliative dermatitis
  - Stevens–Johnson syndrome

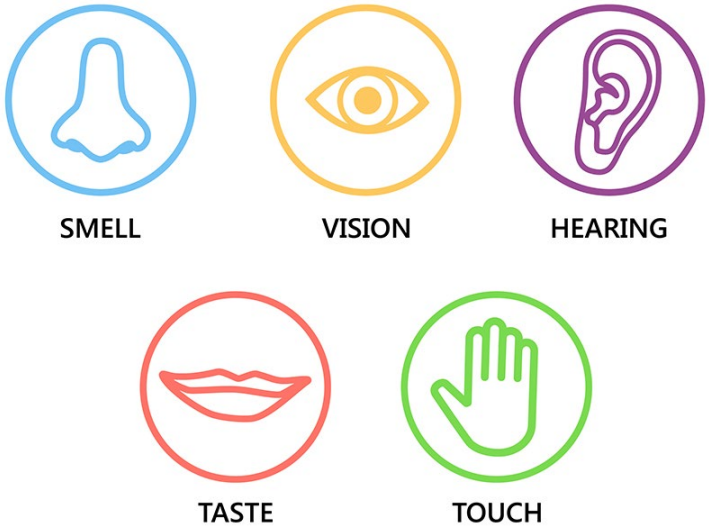
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #7

- Metabolic/Endocrine System Reactions:
  - Decreased appetite, weight loss or increase
  - Flushing, sweating
  - Menstrual disorders, vaginal bleeding
  - Hyperglycemia or hypoglycemia



Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Adverse Reactions #8

- Sensory System and Other Reactions:
  - Taste change
  - Rhinitis
  - Tinnitus
  - Visual disturbances
  - Thirst, fever, chills
  - Vaginitis



Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Contraindications

- Contraindicated in clients with:
  - known hypersensitivity to NSAIDs or aspirin
  - cross-sensitivity with other NSAIDs
  - pregnancy (third trimester) and lactation
  - postoperative pain from CABG surgery
  - rheumatoid arthritis or osteoarthritis (ketorolac, mefenamic, and meloxicam)
  - allergy to sulfonamides or a history of cardiac disease or stroke (celecoxib)
  - Hypertension, peptic ulceration, or GI bleeding (ibuprofen)

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Precautions

- Used cautiously in clients with:
  - pregnancy (pregnancy category B)
  - older adults (risk of ulcer formation)
  - bleeding disorders, renal disease, cardiovascular disease
  - hepatic impairment

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)—Interactions

Interacting Drug	Common Use	Effect of Interaction
Anticoagulants	Prevention of blood clots	Increased risk for bleeding
Lithium	Antipsychotic drug used for bipolar disorder	Increased effectiveness and possible toxicity of lithium
Cyclosporine	Antirejection agent (immunosuppressant)	Increased effectiveness of cyclosporine
Hydantoins	Anticonvulsant	Increased effectiveness of anticonvulsant
Diuretics	Excretion of extra body fluid	Decreased effectiveness of diuretic
Antihypertensive drugs	Blood pressure control	Decreased effectiveness o antihypertensive drug
Long-term acetaminophen use	Pain relief	Increased risk of renal impairment

Pharmacology in Practice Exercise #1

- Why is celecoxib not used to relieve postoperative pain for a client who has undergone coronary artery bypass graft (CABG) surgery?
  - a) Increased risk of duodenal ulcer
  - b) Increased risk of gastric bleeding
  - c) Increased risk of myocardial infarction
  - d) Increased risk of diarrhea

Migraine Headaches

- Pain associated with migraine headaches is believed to be caused by chemical changes in the brain. Drugs used to treat migraine headaches are given:
  - Prophylactically to reduce brain chemical changes
  - To treat the acute pain when a migraine occurs

Drugs Used in the Treatment of Migraine Headaches—Actions and Uses #1

- Preventative Migraine Drugs:
  - Work to block the process of various chemicals in the brain to reduce stimulation of nerve fibers that cause acute pain, vasodilation, and other cellular events
  - Most block serotonin, GABA, or calcium
  - CGRP antagonists block the Calcitonin Gene–Related Peptide from attaching to other proteins or neurons
    - block nociception so nerves are not stimulated, and pains and vasodilation do not occur

Drugs Used in the Treatment of Migraine Headaches—Actions and Uses #2

- Acute Migraine Drugs:
  - Activation of the 5-HT receptors causes vasoconstriction and reduces the neurotransmission, which in turn produces pain relief
  - Selective serotonin drugs are used for the relief of moderate to severe pain and inflammation related to migraine headaches

Drugs Used in the Treatment of Migraine Headaches—Adverse Reactions

- Common Adverse Reactions (Mild and Transient):
  - Dizziness, nausea, fatigue, pain, dry mouth, and flushing
- Cardiovascular System Reactions
  - Coronary artery vasospasm
  - Cardiac arrhythmias and tachycardia
  - Myocardial infarction

Drugs Used in the Treatment of Migraine Headaches—Contraindications and Precautions

- Contraindicated in clients:
  - with known hypersensitivity to selective serotonin agonists
  - with ischemic heart disease, transient ischemic attacks, uncontrolled hypertension, or clients taking monoamine oxidase inhibitors (5-HT agonists)
  - with HIV using protease inhibitors (ergot derivatives)
  - taking macrolide antibiotics (ergot derivatives)
- Used cautiously in clients with:
  - hepatic or renal impairment
  - elderly
  - dialysis
  - pregnancy (pregnancy category C)
  - lactation

Drugs Used in the Treatment of Migraine Headaches—Interactions

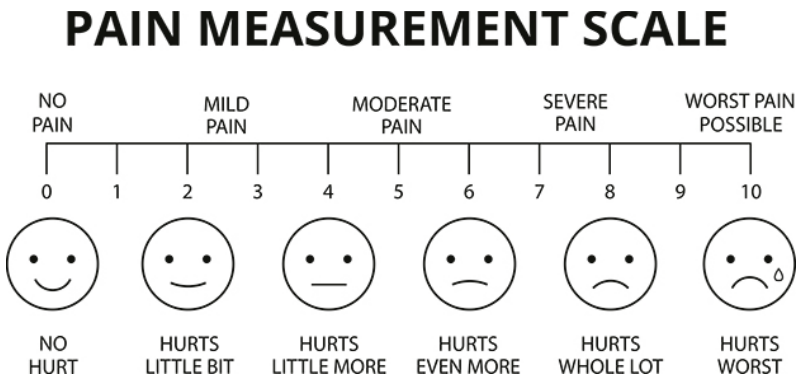
Interacting Drug	Common Use	Effect of Interaction
Cimetidine	Decrease gastric secretions	Increased effectiveness of 5-HT agonist
Oral contraceptives	Birth control	Increased effectiveness of 5-HT agonist

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #1

- Preadministration Assessment
- Objective Data
  - Location of pain
  - Description of site which is the cause of pain
  - Palpate for tenderness in the location of pain, examine the joints if involved
  - Vital signs

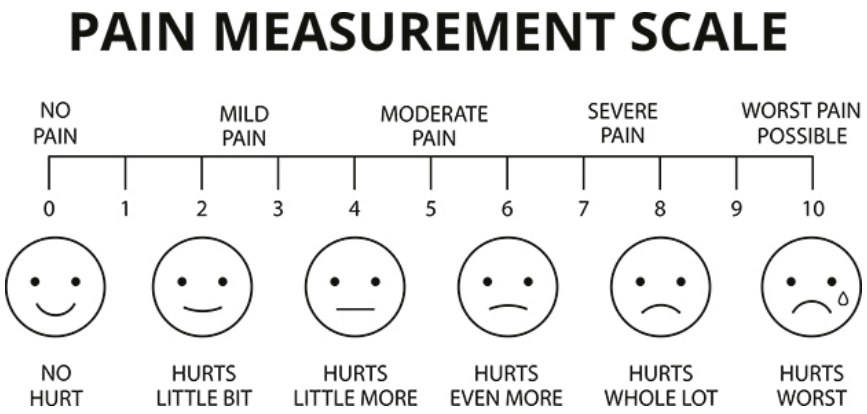
Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #2

- **Preadministration Assessment (continued)**
- **Subjective** Data
  - Pain experience (onset, type, radiation, location, intensity, and duration)
  - Type and duration of symptoms
  - If febrile, describe the type and duration of symptoms
  - Allergy history
  - History of GI bleeding, cardiovascular disease, stroke, hypertension, peptic ulceration, or impaired hepatic or renal function
  - Remedies attempted before seeking care



Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #3

- Ongoing Assessment
  - Monitor pain relief; reassess pain rating 30 to 60 minutes following administration of the drug
  - Use the same pain scale for each assessment of pain
  - Persisting pain: assess and document severity, location, and intensity; monitor vital signs at least every 4 hours
  - Assess for decrease in inflammation and mobility in joints
  - Report any adverse reactions (dark stools, prolonged bleeding)



Pharmacology in Practice Exercise #2

- A client is prescribed an NSAID for osteoarthritis. What assessments should the nurse perform before administration of the NSAID?
  a) Document limitations in mobility
  b) Examine the level of consciousness in the client
  c) Check the level of mental stability of the client
  d) Determine the client's body temperature

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #4

- Nursing Diagnoses
  - Acute or Chronic Pain related to peripheral tissue damage caused by the disease process or GI bleeding or inflammation from NSAID therapy
  - Impaired Physical Mobility related to muscle and joint stiffness
  - Risk for Injury related to adverse reaction of NSAID causing damage to optical field
  - Impaired Skin Integrity related to photosensitivity when using 5-HT agonist for migraine.

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #5

- Planning
  - Expected client outcomes depend on the reason for administration of the drug but may include:
    - Optimal response to therapy (relief of pain and fever)
    - Management of common adverse drug reactions
    - Confidence and understanding of the prescribed medication regimen

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #6

- Implementation
  - Promoting an optimal response to therapy—Oral Administration
    - NSAID administered with food, milk, or antacids
    - If relief is not achieved with one NSAID, client, may have success switching to another NSAID
    - Several weeks of treatment: full therapeutic response

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #7

- Implementation
  - Promoting an optimal response to therapy—Subcutaneous Injection Administration (Migraine)
    - Teach client to use the specific pre-filled syringe or administration device
    - Instruct the client never to use medication that is yellow or cloudy in the dispenser
    - Administration of sumatriptan should be given at the onset of headache, but can be given during the attack; second injection can be given after 1 hour if no pain relief
    - No more than two injections in a 24-hour period
    - Nurse should observe the client's first self-administration of drug to ensure proper technique

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #8

- Implementation
  - Monitoring and Managing Client Needs
    - Acute or Chronic Pain
      - Elderly more vulnerable to GI bleeding due to higher incidence of rheumatoid arthritis and osteoarthritis and use of NSAIDs on long-term basis—monitor for GI bleeding
      - Encourage to take drug with a full glass of water and food

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #9

- Implementation
  - Monitoring and Managing Client Needs
    - Impaired Physical Mobility
      - Provide comfort measures, support limbs, apply heat or cold, rest joint, avoid overuse
      - Assistive mobility devices such as canes, crutches, walkers
      - Walk with the client to encourage ambulation and assess mobility after NSAID administration
      - Clients with osteoarthritis—observe range of motion and monitor pain, tenderness, and swelling

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #10

- Implementation
  - Monitoring and Managing Client Needs
    - Risk for Injury
      - Observe for adverse drug reactions, GI bleeding, and cardiovascular reactions
      - Monitor for visual disturbances (diminishes or changes in vision)—clients on long-term therapy need periodic eye examinations
      - Monitor for serotonin syndrome in clients taking medications for migraines and using antidepressants (SSRI or SNRI): mental changes, tachycardia, blood pressure or temperature elevation, tightness in muscles, and difficulty waking

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #11

- Implementation
  - Monitoring and Managing Client Needs
    - Impaired Skin Integrity: Photosensitivity
      - Skin can become sensitive to light when taking 5-HT agonists for migraine relief
      - Teach client to wear protective clogging and sunscreen when outside
      - Teach that ultraviolet light from tanning salon beds can also cause a reaction—tanning should be discouraged

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #12

- Implementation—Educating the Client and Family
  - Develop a teaching plan for the client and family to include:
    - Long-term use: the client and family need to understand the fact that the drug needs to be taken correctly even if symptoms are relieved
    - Take drug exactly as prescribed
    - Take drug with food or full glass of water unless otherwise indicated

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #13

- Implementation—Educating the Client and Family (continued)
  - Develop a teaching plan for the client and family to include:
    - Teach client to inform all health care providers of NSAID use (dentists)
    - If using NSAID for fever, to notify the primary health care provider if the client is febrile for more than 24 hours after taking the drug
    - Not to self-treat chronic pain with an over-the-counter drug—contact primary health care provider
    - The drug may take several days to produce an effect; contact the provider if no relief after 2 weeks
    - Notify primary provider of any adverse effects

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication #14

- Implementation—Educating the Client and Family (continued)
  - Develop a teaching plan for the client and family to include:
    - If taking a selective serotonin agonist for migraine headache pain, the drugs are used to treat and not to reduce or prevent migraines.
    - Administer the drug at the onset of symptoms. Dose can be repeated after 1 hour.
    - Never take more than two doses in a 24-hour period and notify the primary health care provider if the migraine is not relieved.

Nursing Process—Client Receiving an NSAID Drug or Migraine Medication

- Evaluation
  - Was the therapeutic response achieved? Is the pain relieved or discomfort reduced?
  - Were adverse reactions: identified, reported, and managed?
    - Client reports reduced or eliminated pain
    - Client reports improved mobility
    - Client is free from injury or uses adaptive devices for visual deficits
  - Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study

- A 55-year-old client presents to the physician's office today complaining of pain in the knees and hips. The client has hypertension and diabetes. Current medications include lisinopril 20 mg every day, metformin ER 500 mg twice a day, and aspirin 81 mg every day. The client has tried acetaminophen in the past to treat joint pain, but with little relief. The physician diagnoses the client with osteoarthritis and writes a prescription for ibuprofen 800 mg every 8 hours as needed for pain. The physician has asked you, the nurse, to bring the prescription and provide client teaching.

1. What should the nurse tell the client about taking the ibuprofen with other medications?
2. How should the nurse advise the client to take the ibuprofen?
3. What side effect should the nurse discuss with the client about ibuprofen?