DRUG NUTRIENT INTERACTIONS: What You Need to Know
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LEARNING OBJECTIVES

• Know the difference between drug-nutrient interactions and food-drug interactions
• Identify the most common medication classes with drug-nutrition and food-drug interactions
• Identify the most common side effects of these drugs related to nutrition status and their effects on the elderly
• Demonstrate the CDM and RDN’s role identifying and implementing therapeutic interventions to combat interactions

INTRODUCTION

• The use of medication both prescribed and over-the-counter increase as individuals age
• 50% of American’s have 2 or more chronic disease (i.e. Diabetes, Heart Disease); 61% of individuals >65 years have more than 1 medication and it increases to >90% by age 85 years
• At risk population for drug-nutrient interactions are older adults (>65y), chronically ill individuals, and those that have multiple medications (5+) with long-term drug therapy
• Medications are provided to the older population most often to treat disease, stimulate appetite and for Cognitive/Dementia related issues
Terminology

- **Bioavailability**: Degree to which a drug or substance reaches the circulation and becomes available to the target organ or tissue.
- **Half-Life**: Amount of time it takes for the blood concentration of a drug to decrease by one half of its steady state level.
- **Side-Effect**: Adverse effect/reaction or any undesirable effect of a drug.

Drug-Nutrient Interactions

**Drug-Nutrient Interaction**: Details the changes to the "pharmacokinetics" (characteristic of a drug in terms of its absorptions, distribution, metabolism, and excretion) of the medication as it enters, interacts, and leaves the body. Examples of side effects—falls, depression, confusion, hallucinations, and altered nutritional status.

- **Example:**
  - Omeprazole (Prilosec) depletes/decreases the absorption of vitamin B12.
  - Coumadin (Warfarin) has a decrease in drug effectiveness with inconsistent intakes of Vitamin K.

Pharmacokinetics: Drugs movement through the bodies system

- **Absorption**: Process by which a drug/nutrient proceeds from the site of administration (mouth/PEG) to the systemic circulation (thru the body).
  - Example: Fosamax (alendronate) absorption is decreased by 60% if taken with coffee or juice. It is NOT absorbed at all when ingested with or up to 2 hours after a meal.

- **Distribution**: Movement of the drug/nutrient from one location to another. The elderly, have a decrease in lean muscle, this can affect a drugs ability to move throughout the body. Low albumin level increases the risk for a drug to become toxic.
  - Low Albumin (<3.0g/dL)—can affect drugs such as Dilantin and Coumadin.
PHARMACOKINETICS: Drugs movement through the bodies system

- **Metabolism**: How the drug/nutrient is “chemically changed by the action of enzymes in the liver or intestinal tract”. When a drug is taken orally there is a risk for interaction, additionally the elderly’s liver function tends to decrease with age.
  - Example—Grapefruit juice can inhibit metabolism of some drugs (Amiodarone)
- **Excretion**: How the drug/nutrient is removed from the body through the kidneys. Altered kidney function slows the rate the drug/nutrient leaves the body.
  - Example—Drugs that increase urination such as Lasix (loop diuretic), also increase excretion of Na, K, Cl, Mg, Ca; drugs that decrease urinary excretion of nutrients such as HCTZ (Thiazide diuretics), also enhance renal absorption of Ca

DRUG-NUTRIENT INTERACTIONS & OLDER ADULTS

- **Drug-Associated Factors**
  - Polypharmacy, dosage, duration, frequency
- **Pathological Factors**
  - Older adults more likely to have disease conditions
- **Geriatric Factors**
  - Decreased gastric emptying, visceral blood flow, intestinal motility, changes in kidney and liver function, body composition changes, drug receptors and tissue sensitivity
- **Nutrition-Related Factors**
  - Inadequate consumption of calories, protein, calcium and B vitamins

*Reference, Nutrition Care of the Older Adult, 2016

FOOD-DRUG INTERACTIONS

**Food-Drug Interaction**: The effect produced when a drug and a food or beverage are taken at the same time. An example of a side effect are reduced absorption of nutrients, reduced metabolism of the drug, or altered taste of a specific food.

- **Examples**:
  - Tetracyclines (antibiotic) need to be taken two hours after drinking milk as dairy product can decrease drug absorption
  - Grapefruit juice taken with certain drugs can block the metabolism of the drug in the GI tract, an action that can cause normal dosages of a drug to reach toxic levels in the plasma
COMMON SIDE EFFECTS FROM MEDICATION THAT CAN ALTER NUTRITIONAL STATUS

- Appetite Changes
- Weight Changes
- Edema
- Altered Taste
- Thirst
- Blood Pressure changes
- Dry Mouth
- Potential Dental Issues
- GI problems
- N/V
- Diarrhea/Constipation
- Drowsiness

MEDICATION EFFECTS ON NUTRITIONAL STATUS

- **Dry Mouth**—a major side effect of most prescription and over the counter (OTC) medications, as these medications “impair salivary flow” which causes dry mouth. Examples of meds—Antidepressants (Elavil), antibiotics, Parkinson’s and HTN medications, and drugs to decrease urinary incontinence.

- **Mouth Sores**—Immunosuppressive therapy, medications to treat Hypertension, and certain chemotherapy drugs can cause “oral sores”, inflammation and discoloration of the soft tissues inside the mouth.

MEDICATION EFFECTS ON NUTRITIONAL STATUS

- **Altered Taste**—Certain types of medications may be secreted into the saliva causing a “metallic” and/or bitter taste. Examples include non-steroid anti-inflammatory drugs, NSAIDs, cardiovascular medications, central nervous system stimulants, respiratory inhalers, antibiotic (Flagyl), Sleep aid (Lunesta) and medications to treat smoking cessation.

- **Stomach Irritation**—NSAID drugs (aspirin, ibuprofen, Advil, and Motrin), are known to cause nausea, vomiting, sudden/serious bleeding.
*Intestinal Peristalsis*—Medications to treat certain cancers, depression/anxiety, creates “slow peristalsis” causing constipation. Examples: Antipsychotics, antihistamines

*Damages Intestinal Bacteria*—Clindamycin (antibiotic) may cause C.Difficile overgrowth, leading to pseudomembranous colitis

*Diarrhea*—Laxatives, antiretroviral, antibiotics, antineoplastics, and liquid medications in elixirs containing sugar alcohols

*Constipation*—Narcotic agents (codeine, methadone, or morphine) cause constipation

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**Glucose (blood sugar) Changes:**
- **Meds that elevated glucose levels (hyperglycemia)**—Antipsychotics (Zyprexa), antiretrovirals, diuretics, hormones, steroids, Danazol, some appetite stimulants, medications to treat high lipid levels
- **Meds that lower glucose levels (hypoglycemia)**—Ethanol, quinine, disopyramide (antiarrhythmic) and pentamidien isethionate (antiprotozoal)

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**Appetite Changes**
- **Increase in appetite**—Antidepressants (Elavil, Remeron), most antipsychotic medications (Zyprexa, Clozaril), stimulate appetite, and cause weight gain
- **Decrease in appetite**—Amphetamines (Adderall), drug used to treat ADHD and Narcolepsy

**Altered Renal Function**, including urinary retention and frequency.
- **Urinary Retention**—Cymbalta (antidepressant)
- **Urinary Frequency**—Calcitonin (used in treatment of Osteoporosis)
- **Renal Failure**—Advil and Motrin, known as NSAIDs can cause “acute renal failure”

**Lipid Irregularities**—
- Elevated cholesterol and triglyceride levels—Antipsychotics (Thorazine and Zyprexa); Risperdal may increase triglycerides
**MEDICATIONS AND FOOD/DRINKS**

- **Pressor Amines/Monoamine Oxidase Inhibitors (MAOIs)**—These are nitrogen containing organic compounds found naturally in certain foods such as aged cheese or meats (Turkey). The elderly person can experience an elevated blood pressure caused by constriction of blood vessels, with resultant headaches, mood changes, confusion and death.

- **Alcohol**—The geriatric population should not mix alcohol and "antidepressants, antibiotics, anticoagulant, including drugs that are used for neurological assistance. Additionally, some OTC meds can cause stomach irritation, aspirin and ibuprofen.

**MEDICATIONS AND FOOD/DRINKS**

- **Caffeine**—Limit caffeine when taking cardiac regulators, calcium-channel blockers, anti-psychotics/antidepressants/anxiety, anti-ulcer agents, diuretics, anticonvulsants, bronchodilators, stimulants/relatives, anticonvulsants, NSAIDs, pain relievers, decongestants, potassium supplements. Decaffeinated tea and coffee are okay.
  - Examples: Ritalin, Theophylline, Mobic

- **Citrus and grapefruit juice**—Research articles report that there are "85 medications" that potentially interact with grapefruit juices; and "45 prescription drugs" have life-threatening effects, kidney failure, gastro-intestinal problems, rhabdomyolysis (muscle weakness), and "sudden death". Citrus fruits like oranges, Seville oranges, limes, tangelos, pomelos, and grapefruit interact with cholesterol lowering medications, immunosuppressant and antihistamines; there is an "active ingredient" in these fruits that will not allow the drugs to metabolize, allowing more of the drug to enter the bloodstream. Instead of the drug helping/healing, it becomes toxic.

**MEDICATIONS AND FOOD/DRINKS**

- **Vitamin K**—A fat-soluble vitamin that negatively interacts with the blood clotting medication Warfarin (Coumadin). Provide the geriatric person with consistent amount of vitamin K containing foods. Natural food and herbal medications that are problematic are: avocados, St. John Warts, and CoQ10, studies cite that they decrease the "anticoagulant action of warfarin."

- **Diuretics**—The qualified dietary manager (DM), and dietitian nutritionist (RDN), will need to make certain the following nutritional interventions are in place for the geriatric patient: a low sodium diet, make sure that the diet contains potassium and magnesium or that there is a supplement/medication in place. Avoid natural licorice, monitor electrolytes levels with diuretic loss; potassium, sodium, magnesium, phosphorus, calcium and bicarbonate. Maintain adequate fluids offered to maintain hydration. The DM will notify the RDN when the above laboratory values are altered.
What is the CDM’s Role?

- CDM Scope of Practice
  - Conduct routine client nutritional screening which includes food/fluid intake information
  - Identify nutrition problems using established guidelines to distinguish between routine and at risk individuals
  - Utilize standard nutrition care procedures following ethical and confidentiality principles and practices
  - Document nutritional screening data in the medical record and complete forms (i.e. care plans, MDS, etc.)
  - Review intake records, conduct visual meal rounds, and document food intake
  - Participate in care conferences and review effectiveness of nutrition care
  - Provide basic diet information using evidence based educational materials

What is the RD’s role?

- The RD must provide ongoing food/nutrient drug education and counseling when individuals begin taking medications. This includes monitoring of the impact that the medication may have on nutritional status and/or laboratory values
  - Medical Nutrition Therapy (MNT) related to when and how to take drug
  - Dietary suggestions on how to manage side effects and potential nutrition problems from a particular medication use
  - Possible interactions between medications and vitamin/mineral/food supplements

DM/RD COLLABORATION

- The resident or patient’s medication list should be reviewed when completing a nutrition assessment, as well as by the interdisciplinary team, which includes the DM, RDN, medical director, nursing, and the pharmacist. The IDT must ensure that the older adult is not at risk for food and drug-nutrient interaction.
- Identify when to talk to the RD:
  - Make sure to regularly visit and interview resident to ask questions such as how is their appetite, does food/drink taste ok, or do they have any bowel changes
  - Monitor labs regularly
  - Monitoring the resident/patient during dining and activities
THINGS TO REMEMBER

- Care facilities should not have grapefruit including juice or natural licorice on their menus
- Menus should have consistent servings of Vitamin K foods such as cabbage, leafy greens, broccoli and fresh avocados
- Coordinate with your IDT and consult the diet manual and/or the Food Medication Interaction Resource book for drug/nutrient interactions

References

- http://www.fda.gov/Drugs/ResourcesForYou/ucm163959.htm
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3191675/
- http://www.healthwise.org/conditionsandtopics/how-to-be-medicinewise/side-effects
- Health and Human Services
  - www.HHS.gov

Questions?