NR-565 Advanced Pharmacology Fundamentals

Midterm Exam Study Guide (Notes Week 1 – 4)

Week 1

1. APRN prescribing role
    a. The safe and competent practice of prescribing and managing medications requires a sound understanding of drugs and the conditions that they are used to manage.
    b. Prescriptive authority is determined by state law. As a result of differences from state to state, advanced practice providers may have full prescriptive authority in some states yet face significant restrictions in other states. The stark differences particularly affect providers who serve in locum tenens staffing positions or who have practices in two contiguous states.
2. benefits of full practice authority
    a. Whether APRNs possess full prescriptive authority depends on their legal right to prescribe without a supervisory or collaborative requirement. APRNs are educated to practice and prescribe independently without supervision; however, some state laws require that they practice in collaboration with or under the supervision of a physician. In these situations, some physicians limit the types of drugs that the APRN can prescribe. State laws may place additional restrictions with regard to controlled drugs.
3. promoting positive outcomes through prudent prescribing practices
    a. Patient education about treatment regimens increases medication adherence. Education provides an opportunity to address questions and dispel misunderstanding, reducing errors. Medication education should include:
        i. medication name: generic vs. trade name
        ii. purpose: the reason for taking the medication, including the desired effect

iii. dosing regimen: how much medication, how often, and the time of day
iv. administration: preparations needed for taking, such as with or without food
v. adverse effects: all possible risks and how to manage them
vi. special storage needs if needed such as refrigeration or use of the original container
vii. associated laboratory testing, including regular appointments
viii. food or drug interactions: what to avoid and what measures to take
ix. duration of therapy: length of administration

b. All medications require monitoring to achieve a therapeutic outcome. If the medication is not creating the desired outcome, it likely will not be continued. Every drug has side effects, requiring ongoing assessment of the ratio of benefits and risk. According to Rosenthal and Burcham, (2021) drug monitoring has three aims:
   i. determining therapeutic dosage
   ii. evaluating medication adequacy
   iii. Identifying adverse effects

4. overview of Beer's Criteria
   a. Are guidelines for healthcare professionals to help improve the safety of prescribing medications for older adults. They emphasize deprescribing medications that are unnecessary, which helps to reduce the problems of polypharmacy, drug interactions, and adverse drug reactions, thereby improving the risk–benefit ratio of medication regimens in at-risk people.
   b. The criteria are used in geriatrics clinical care to monitor and improve the quality of care. They are also used in training, research, and healthcare policy to assist in developing performance measures and document outcomes. These criteria include lists of medications in which the potential risks may be greater than the potential benefits for people 65 and older. By considering this information, practitioners may be able to reduce harmful side effects caused by such medications. The Beers Criteria are intended to serve as a guide for clinicians and not as a substitute for professional judgment in prescribing decisions. The criteria may be used in conjunction with other information to guide clinicians about safe prescribing in older adults.
5. principles of pharmacodynamics, pharmacokinetics, and pharmacogenomics
   a. **pharmacodynamics**

i. Pharmacodynamics is the study of the biochemical and physiologic effects of drugs on the body and the molecular mechanisms by which those effects are produced.
ii. Dose–Response Relationships
    1. Minimal amount of drug needed to elicit a response, the maximal response a drug can elicit, and how much to increase the dosage to produce the desired increase in response.
    2. Maximal Efficacy
        a. largest effect that a drug can produce.
    3. Relative Potency
        a. amount of drug we must give to elicit an effect
        b. It is important to note that the potency of a drug implies nothing about its maximal efficacy!

b. **Pharmacokinetics**
    i. study of drug movement throughout the body. There are four basic pharmacokinetic processes: absorption, distribution, metabolism, and excretion. The combination of metabolism and excretion is called **elimination**.
        1. Absorption:
            a. drug's movement from its site of administration into the blood
            b. Drug preparations are considered **chemically equivalent** if they contain the same amount of the identical chemical compound (drug).
            c. Preparations are considered **equal in bioavailability** if the drug they contain is absorbed at the same rate and to the same extent.
            d. Factors affecting Absorption.
                i. Rate of Dissolution
                ii. Surface Area
                iii. Blood Flow
                iv. Lipid Solubility
                v. pH Partitioning
                vi. Routes of Administration
        2. Distribution
            a. Drug's movement from the blood to the interstitial space of tissues and from there into cells.
            b. 3 Major Factors Affecting Distribution:
                i. Blood Flow to Tissues

ii. Ability to Exit Vascular System
    1. Leave system at capillary beds
    2. BBB has tight junctions.
        a. Must be lipid soluble or leave by transport system
        b. PGP pumps drugs back into the blood and thereby limits their access to the brain and placenta.
iii. Ability of Drugs to Enter the Cells (lesser extent)
    1. Must enter by transport system or by being lipid soluble (OR BOTH)

3. Metabolism
    a. Enzymatically mediated alteration of drug structure
        i. Most taken to liver by the hepatic microsomal enzyme system (P450 system).
            1. P450 System
                a. 12 Enzyme Families.
                b. CYP1, CYP2, and CYP3 metabolize drugs.
                c. The other 9 metabolize endogenous compounds

4. Excretion
    a. Is the movement of drugs and their metabolites out of the body.
    b. Drugs and their metabolites can exit the body in urine, bile, sweat, saliva, breast milk, and expired air**. The most important organ for drug excretion is the kidney**.

ii. 3 Ways Drugs Cross Cell Membranes
    1. Channels and Pores
        a. Very few drugs cross membranes through channels or pores. The channels in membranes are extremely small and are specific for certain molecules. Consequently, only the smallest of compounds, such as potassium and sodium, can pass through these channels and then only if the channel is the right one.
    2. Transport Systems
        a. Transport systems are carriers that can move drugs from one side of the cell membrane to the other side.