Intended Learning Outcomes

HNN215: Quality Use of Medicines

Week 1- Introduction to QUM (Part A) & Medicines used to treat pain (Part B):

Introduction to QUM:

Demonstrate an understanding of the principles of quality use of medicines:
Quality use of medicines is using medicines safely and effectively, choosing suitable medicines that are relevant to the situations and managing options wisely

Identify the causes and effects of drug errors and explain relevant nursing actions to minimise risks

- Medication errors increase the risk of adverse drug reactions
- Causes: distraction, poor communication, lack of documentation, wrong medication calculation, wrong patient, wrong time, wrong dose, wrong medication, wrong route, tiredness, stress, medications that sound/ look alike
- Effects: illness, death, allergic reaction
- To minimise risks:
  - right patient, right medication, right time, right dose, right route
  - patient participation, listen to patients and include them in medication management
  - be confident in medication calculations
  - documentation
  - communicate effectively with patient, family, nurses, pharmacists, doctors etc
  - review medications frequently
  - check that medication prescription is legal and medication order is legible
  - assess the patient and situation before and after administration

Apply clinical decision making to ensure safe medication practices
Calculate medication doses
Interpret medication prescriptions accurately
Demonstrate evidence-based practices in medication documentation
Explain and apply relevant pharmacodynamic and pharmacokinetic concepts (eg bioavailability, half-life, steady state concentration, first pass effect, metabolism and excretion)

- Bioavailability: percentage of agent administered that reaches the systemic circulation; absorption efficiency of a medication
- Half life: time interval required for elimination processes to reduce the concentration of a medication in the body by one half
- Steady state concentration: the amount of drug in the plasma has built up to a concentration level that is therapeutically effective and as long as regular doses are administered to balance the amount of drug being cleared, the drug will be active
- First pass effect: medications administered orally enter the liver first and are metabolised before they enter the systemic circulation
- Metabolism: process of energy and material transformation in all living cells; the sum of all physical and chemical changes that take place within a microorganism
- Excretion: process by which a drug is eliminated from an organism either in an unaltered form (unbound molecules) or modified as a metabolite

Identify the factors that may result in altered medication effects in older persons and paediatrics
Older persons:

- Absorption of some nutrients from the GIT diminishes with advancing age

- Some medications may pass through the digestive tract unchanged
- Slowed rate of passage of medications through the lower GIT
- Reduction in blood flow due to age results in a decrease in the absorptive surface in the intestine
- Faster topical absorption due to thinner skin surface
- IM absorption is difficult to anticipate because peripheral circulation is affected by environmental changes
- Total body water is decreased resulting in diminished volume of distribution of some water soluble medications
- Total body fat content is increased, altering the distribution of fat soluble medications
- Age related muscle tone loss alters distribution of some medications
- Decrease in protein binding ability
- Enzyme levels decrease because of decline in liver function
- Liver blood flow reduces leading to a decline in the body's ability to transform active medications into inactive metabolites
- More likely to experience medication toxicity because of the accumulation of medications

Paediatrics:

- Reduced gastric acidity due to immature gastric acid producing cells- medication may pass through the digestive tract unchanged
- Slower gastric emptying
- Faster topical absorption because of thinner skin surface
- IM absorption is difficult to anticipate because peripheral circulation is affected by environmental changes
- Greater total body water content, require higher doses of water soluble medications
- Lower total body fat content, fat soluble medications must be varied
- Decreased protein binding
- Blood brain barrier is immature, leading to more medications being able to enter the brain
- Decreased enzyme levels
- May require higher levels of medication due to higher metabolic rates
- Decreased tubular secretion and reabsorption due to immature kidneys
- Decreased perfusion to the kidneys
- Lower urine pH, medications circulate longer and have the potential of reaching toxic levels
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Utilise a drug diary to consolidate your knowledge of broad drug groups

<u>Medicines used to treat pain:</u>

Identify the major classes of analgesic agents and examples of medications found in each:
Non-narcotics: paracetamol, Panadol rapid, herron
NSAIDS: ibuprofen, diclofenac, celecoxib (COX2)
Narcotics: oxycodone, morphine, fentanyl, targine
Adjuvants: diazepam, gabapentin

Briefly describe the actions of each major class (one to two sentences):
Non-narcotics: given for mild to moderate pain. Provides an analgesic effect by inhibiting prostaglandin synthesis in the CNS and activating descending pathways- also has antipyretic effect (reduces temperature)

Intended Learning Outcomes

NSAIDS: given for pain and inflammation for injury, analgesic/ anti- inflammatory and anti- pyretic actions. It inhibits the production of prostaglandins by blocking COX reducing inflammation and producing analgesia
Narcotics: indicated for acute or chronic mild, moderate to severe pain. Act on opioid receptors in CNS and GIT, producing analgesia
Adjuvants: not pain medications but can work with analgesic to enhance pain relief

Identify significant adverse drug reactions (ADRs) for each drug class:
Non-narcotics: significant risk of hepatoxicity or liver toxicity with elevated doses
NSAIDS: GIT bleeding, NSAID induced renal impairment, increased risk of cardiovascular events
Narcotics: respiratory depression, constipation, bradycardia and hypotension
Adjuvants: injection site pain, skin ulceration

Explain relevant nursing actions to manage risk when administering these medications:
Non-narcotics: monitor liver function
NSAIDS: use lowest effective dose for the shortest period of time, monitor renal function
Narcotics: assessment of sedation and associated side effects, give laxative with analgesics, be aware of legal obligations of administering narcotic analgesics
Adjuvants: monitor injection site

Synthesise knowledge to inform clinical decision making for patient assessment, education and evaluation
Demonstrate evidence-based practice in medication documentation