Pharm.D Syllabus

Year 04

Subjects

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4.1 - Pharmacotherapeutics III

Theory

- Gastrointestinal system: Peptic ulcer disease, gastroesophageal reflux disease, inflammatory bowel disease, alcoholic liver disease, viral hepatitis including jaundice, and drug-induced liver disorders.
- Haematological system: Anaemias, venous thromboembolism and drug-induced blood disorders.
- Nervous system: Epilepsy, Parkinsonism, stroke and Alzheimer's disease.
- Psychiatric disorders: Schizophrenia, affective disorders, anxiety disorders, sleep disorders and obsessive-compulsive disorders.
- Pain management: Pain pathways, neuralgias and headaches.
- Evidence-based medicine.

Practical

- Ward-round participation.
- Clinical discussion on the selection of drug therapy.
- Observation, follow-up and presentation of medical cases.

4.2 - Hospital Pharmacy

Theory

- Hospital - its Organisation and functions
- Hospital pharmacy-Organisation and management
- Organizational structure-Staff, Infrastructure & work load statistics
- Management of materials and finance
- Roles & responsibilities of hospital pharmacist 3 The Budget - Preparation and implementation 4 Hospital drug policy
- Pharmacy and Therapeutic committee (PTC)
- Hospital formulary
- Hospital committees - Infection committee - Research and ethical committee developing therapeutic guidelines
- Hospital pharmacy communication - Newsletter 5 Hospital pharmacy services
- Procurement & warehousing of drugs and Pharmaceuticals
- Inventory control Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock
- Drug distribution in the hospital
- Individual prescription method
- Floor stock method
- Unit dose drug distribution method
- Distribution of Narcotic and other controlled substances
- Central sterile supply services - Role of pharmacist 6 Manufacture of Pharmaceutical preparations
- Sterile formulations - large and small volume parenterals
- Manufacture of Ointments, Liquids, and creams
- Manufacturing of Tablets, granules, capsules, and powders
- Total parenteral nutrition 7 Continuing professional development programs Education and training 8 Radio Pharmaceuticals - Handling and packaging 9 Professional Relations and practices of hospital pharmacist

Practical

- Assessment of drug interactions in the given prescriptions
- Manufacture of parenteral formulations, powders.
- Drug information queries.
- Inventory control
- List of Assignments:

- Design and Management of Hospital pharmacy department for a 300 bedded hospital.
- Pharmacy and Therapeutics committee - Organization, functions, and limitations.
- Development of a hospital formulary for 300 bedded teaching hospital
- Preparation of ABC analysis of drugs sold in one month from the pharmacy.
- Different phases of clinical trials with elements to be evaluated.
- Various sources of drug information and systematic approach to provide unbiased drug information.
- Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.

4.3 - Clinical Pharmacy

Theory

- Definitions, development and scope of clinical pharmacy
- Introduction to daily activities of a clinical pharmacist
- Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)
- Ward round participation
- Adverse drug reaction management
- Drug information and poisons information
- Medication history
- Patient counseling
- Drug utilisation evaluation (DUE) and review (DUR)
- Quality assurance of clinical pharmacy services
- Patient data analysis The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.
- Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results
- Haematological, Liver function, Renal function, thyroid function tests
- Tests associated with cardiac disorders
- Fluid and electrolyte balance
- Microbiological culture sensitivity tests
- Pulmonary Function Tests
- Drug & Poison information
- Introduction to drug information resources available
- Systematic approach in answering DI queries
- Critical evaluation of drug information and literature
- Preparation of written and verbal reports
- Establishing a Drug Information Centre
- Poisons information-organization & information resources
- Pharmacovigilance
- Scope, definition and aims of pharmacovigilance
- Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]
- Reporting, evaluation, monitoring, preventing & management of ADRs
- Role of pharmacist in management of ADR.

- Communication skills, including patient counselling techniques, medication history interview, presentation of cases.
- Pharmaceutical care concepts
- Critical evaluation of biomedical literature
- Medication errors

Practical

- Answering drug information questions.
- Patient medication counselling.
- Case studies related to laboratory investigations.
- Patient medication history interviews.

4.4 - Biostatistics and Research Methodology

Theory

- Research Methodology
- Types of clinical study designs: Case studies, observational studies, interventional studies,
- Designing the methodology
- Sample size determination and Power of a study Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study
- Report writing and presentation of data 2 Biostatistics
- 1 a) Introduction
- Types of data distribution
- Measures describing the central tendency distributions-average, median, mode
- Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.
- Data graphics Construction and labeling of graphs, histogram, piecharts, scatter plots, semilogarthimic plots
- Basics of testing hypothesis
- Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals.
- Level of significance (Parametric data)- students t test (paired and unpaired), chi Square test, Analysis of Variance (one-way and two-way)
- Level of significance (Non-parametric data)- Sign test, Wilcoxan's signed rank test, Wilcoxan rank sum test, Mann Whitney U test, Kruskal-Wall is test (one way ANOVA)
- Linear regression and correlation-Introduction, Pearsonn's and Spearmann's correlation and correlation co-efficient.
- Introduction to statistical software: SPSS, Epi Info, SAS.
- Statistical methods in epidemiology Incidence and prevalence, relative risk, attributable risk
- Computer applications in pharmacy Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy - Patient record database management, Medication order entry - Drug labels and list - Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.
- Computer In Community Pharmacy Computerizing the Prescription Dispensing process Use of Computers for Pharmaceutical Care in community pharmacy Accounting and General ledger system
- Drug Information Retrieval & Storage : Introduction - Advantages of Computerized Literature Retrieval Use of Computerized Retrieval

4.5 - Biopharmaceutics and Pharmacokinetics

Theory

- Biopharmaceutics
- Introduction to Biopharmaceutics
- Absorption of drugs from gastrointestinal tract.
- Drug Distribution.
- Drug Elimination.
- Pharmacokinetics
- Introduction to Pharmacokinetics.
- Mathematical model
- Drug levels in blood.
- Pharmacokinetic model
- Compartment models
- Pharmacokinetic study.
- One compartment open model.
- Intravenous Injection (Bolus)
- Intravenous infusion.
- Multicompartment models.
- Two compartment open model.
- IV bolus, IV infusion and oral administration
- Multiple - Dosage Regimens.
- Repititive Intravenous injections - One Compartment Open Model
- Repititive Extravascular dosing - One Compartment Open model
- Multiple Dose Regimen - Two Compartment Open Model
- Nonlinear Pharmacokinetics.
- Introduction
- Factors causing Non-linearity.
- Michaelis-menton method of estimating parameters.
- Noncompartmental Pharmacokinetics.
- Statistical Moment Theory.
- MRT for various compartment models.
- Physiological Pharmacokinetic model.
- Bioavailability and Bioequivalence.

- Introduction.
- Bioavailability study protocol.
- Methods of Assessment of Bioavailability

Practical

- Improvement of dissolution characteristics of slightly soluble drugs by some methods.
- Comparison of dissolution studies of two different marketed products of same drug.
- Influence of polymorphism on solubility and dissolution.
- Protein binding studies of a highly protein bound drug and poorly protein bound drug.
- Extent of plasma-protein binding studies on the same drug (i.e. highly and poorly protein bound drug) at different concentrations in respect of constant time.
- Bioavailability studies of some commonly used drugs on animal/human model.
- Calculation of Ka, Ke, t1/2, Cmax, AUC, AUMC, MRT etc. from blood profile data.
- Calculation of bioavailability from urinary excretion data for two drugs.
- Calculation of AUC and bioequivalence from the given data for two drugs.
- In vitro absorption studies.
- Bioequivalency studies on the different drugs marketed.(eg) Tetracycline, Sulphamethoxzole, Trimethoprim, Aspirin etc., on animals and human volunteers.
- Absorption studies in animal inverted intestine using various drugs.
- Effect on contact time on the plasma protein binding of drugs.
- Studying metabolic pathways for different drugs based on elimination kinetics data.
- Calculation of elimination half-life for different drugs by using urinary elimination data and blood level data.
- Determination of renal clearance.

4.6 - Clinical Toxicology

Theory

- General principles involved in the management of poisoning
- Antidotes and the clinical applications.
- Supportive care in clinical Toxicology.
- Gut Decontamination.
- Elimination Enhancement.
- Toxicokinetics.
- Clinical symptoms and management of acute poisoning with the following agents -
- Pesticide poisoning: organophosphorous compounds, carbamates, organochlorines, pyrethroids.
- Opiates overdose.
- Antidepressants
- Barbiturates and benzodiazepines.
- Alcohol: ethanol, methanol.
- Paracetamol and salicylates.
- Non-steroidal anti-inflammatory drugs.
- Hydrocarbons: Petroleum products and PEG.
- Caustics: inorganic acids and alkali.
- Radiation poisoning
- Clinical symptoms and management of chronic poisoning with the following agents - Heavy metals: Arsenic, lead, mercury, iron, copper
- Venomous snake bites: Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries.
- Plants poisoning. Mushrooms, Mycotoxins.
- Food poisonings
- Envenomations - Arthropod bites and stings.
- Substance abuse: Signs and symptoms of substance abuse and treatment of dependence
- CNS stimulants :amphetamine
- Opioids
- CNS depressants
- Hallucinogens: LSD
- Cannabis group
- Tobacco

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