SYLLABUS OF PHARMACOLOGY FOR UNDERGRADUATE MEDICAL STUDENTS

GOAL: To inculcate a rational and scientific basis of therapeutics in a medical graduate

OBJECTIVES:

(a) Knowledge and intellectual skills

At the end of the course, the learner shall be able to:

1. Understand the general principles of drug action and handling of drugs by the body in all the individuals including children, elderly, lactating and pregnant women and those having a renal and/or hepatic disease and genetic variations.
2. Prescribe drugs rationally by:
    a. Understanding the importance of both the non-drug and drug treatment
    b. Selection of drugs based on suitability, tolerability, efficacy and cost.
3. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered conditions, National Health Programmes and emergency medical conditions.
4. Foresee, prevent and manage adverse drug events and drug interactions.
5. Use antimicrobials judiciously for therapy and prophylaxis.
6. Understand and implement the concepts of essential medicines, pharmacoeconomics and evidence-based medicine for improving the community health care.
7. Describe the clinical presentation and management of common poisoning including bites and stings.
8. Understand the basic concepts of new drug development with emphasis on design and conduct of clinical trials and interpretation of their results.

(b) Psychomotor skills

At the end of the course, the learner shall be able to:

1. Write a correct, complete and legible prescription for common ailments including those in the National health Programmes and emergency medical conditions.
2. Calculate the drug dosage using appropriate formulae for an individual patient.
3. Administer the required dose of different drug formulations using appropriate devices and techniques (.e.g injections, inhalestrs, transdermal patches etc.).
4. Advice and interpret the therapeutic monitoring reports of important drugs.
5. Identify, analyze and report adverse drug reactions to appropriate authorities.
6. Retrieve drug information from appropriate sources including the electronic resources.
7. Analyse critically drug promotional literature in terms of pharmacological actions of the ingredients, rational/irrational nature of the preparation, economics of the use and claims by the pharmaceutical companies.

8. Interpret data from in-vitro and in-vivo experiments designed to study the effect of drugs in animals and human beings.

(c) Attitude and communication skills

At the end of the course, the learner shall be able to:

1. Communicate with the patient regarding optimal use of drug therapy, devices and storage of medicines.
2. Follow the drug treatment guidelines laid down for common diseases including those covered under the national Health Programmes and emergency medical conditions and be capable of initiating and monitoring the treatment, recording progress and assessing the outcome.
3. Motivate patients with chronic diseases to adhere to the line of management as outlined by the health care provider.
4. Appreciate the relationship between cost of treatment and patient compliance.
5. Exercise caution in prescribing drugs likely to produce dependence and recommend the line of management.
6. Understand the legal and ethical aspects of prescribing drugs.
7. Evaluate the ethics, scientific procedures, social and legal implications involved in the development and introduction of new drugs.

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COURSE CONTENTS IN PHARMACOLOGY, DELHI UNIVERSITY

(a) Knowledge

(I) Concepts of General and Clinical Pharmacology

1 Introduction: definition, historical perspective, branches and scope of the subject of pharmacology and its relation with other medical disciplines

2 Nature and sources of Drugs, Drug nomenclature and dosage forms

3 Routes of drugs' administration; advantages and disadvantages of different routes

4-6 Pharrmacokinetic considerations: drug absorption, distribution, biotransformations and excretion

7 Pharmacokinetic concepts of bioavailability, apparent volume of distribution (aVd), half life (t½), and clearance (CL) that are used to decide the doses and rational dosing during the drug treatment.

8-9 Pharmacodynamics; site and mechanism of drug action, drug receptors and receptor regulation, concepts of agonists, antagonists, partial agonist and inverse agonist drugs

10 Quantitative aspect of drug action: analysis of dose response curve and therapeutic index (safety index)

11 Factors affecting drug action and doses, how to prolong or shorten the drug action and effects

12 Drug interactions and concept of pharmacogenomics/-genetics in drug action, effects and ADRs

13 Adverse drug reactions (ADRs) and role of pharmacovigilance activity in ADR monitoring

14 Concept of evidence-based medicine, essential medicines, pharmacoeconomics, P-drugs and rational prescribing

15 Development of new drugs : pre-clinical and clinical phases of drug evaluation

16 Scope and relevance of Clinical Pharmacology

17 Essential medicine, rationality of fixed dose combinations

18 Drug regulation acts and other legal aspects

(b) Systemic Pharmacology – Drug oriented teaching,

(Here a core information about drugs is to be given that should include pharmacological actions, mechanism of action, indications, contraindications, side effects, drug interactions, precautions etc.)

(II) Drugs Affecting Autonomic Nervous System (ANS)

19 Introduction to Pharmacology of ANS

20-21 Cholinergic drugs: cholinoceptor agonist and cholinesterase inhibiting drugs

22 Anticholingergic drugs: cholinoceptor blocking agents

23-24 Adrenergic drugs: adrenoceptor agonist and sympathomimetic drugs

25-26 Anti-adrenergic drugs: adrenoceptor antagonists (α & β receptor blockers) and sympatholytic agents

(III) Drugs Affecting Peripheral Nervous System (PNS)

27 Local anaesthetics

28 Skeletal muscle relaxants

(IV) Drugs Affecting Cardiovascular System (CVS)

29 Drugs affecting vascular tone and volume of circulation, renin angiotensin system and other mechanisms affecting this system

30-31 Antihypertensive drugs

32 Anti-anginal drugs, management of Myocardial Infarction

33-34 Drugs for heart failure

35 Anti-arrythmic agents*

36 Anti-dyslipidemic agents, drugs used in peripheral vascular disease*

37 Nitric oxide donors and inhibitors and basic concepts of treatment of shock*

(V) Drugs Affecting Autacoids, Inflammation and Gout

38 Histamine, serotonin & their antagonists, treatment of migraine

39 PGs, LTs

40 PAF*

41 NSAIDs

42 Drug treatment of gout, rheumatoid arthritis & other autoimmune diseases

(VI) Drugs Affecting Kidney Function

43-44 Diuretics

45 Antidiuretics*

(VII) Drugs Affecting Respiratory System

46 Antitussives, expectorants, mucolytics*

47 Drug treatment of bronchial asthma, COPD

(VIII) Drugs Affecting Gastro-intestinal System

48-49 Drugs for gastric acidity, peptic ulcer & GERD

50 Antiemetic and prokinetic agents

51 Drugs for constipation and Inflammatory Bowel Disease

52 Antidiarrhoeal agents

(IX) Drugs Acting on Blood

53-54 Agents used to treat anemias and haematopoietic growth factors

55 Coagulants and anticoagulants

56 Antiplatelet drugs

57 Fibrinolytic, antifibrinolytic, plasma expanders

(X) Drugs Affecting Central Nervous system

58 Introduction and basic concepts of drugs affecting CNS activity: Neurotransmitters and their pathways and important sites of Central Nervous System effect of drugs

59 Sedative hypnotic drugs

60 General anaesthetics with preanaesthetic medications

61-62 Antiepileptic drugs

63 Antipsychotic drugs

64 Antianxiety drugs

65 Antidepressant and antimaniac drugs

66 Opioid analgesic and antagonists

67 Antiparkinsonian drugs and drugs for other neurodegenerative and movement disorders

68 Pharmacology of ethyl alcohol and other alcohols

69-70 Pharmacology of CNS stimulants, psychomimetic drugs, drug dependence and substance abuse

(XI) Drugs Affecting Endocrine System and its Diseases

71 Pharmacology of pituitary and hypothalamic hormones

72 Thyroid hormones and antithyroid drugs

73 Estrogen, progesterone and inhibitors

74 Oral contraceptives & HRT

75 Androgen

76-77 Drugs for diabetes mellitus: Insulin and oral antidiabetic agents

78-79 Adrenocorticosteroids

80 Parathyroid hormones and drugs affecting calcium balance

81 Drugs acting on uterus

82 Drug treatment for infertility and erectile dysfunctions

(XII) Pharmacology of Chemotherapeutic Agents

83-84 Introduction and basic principles of chemotherapy of infection, infestation and neoplastic diseases and concepts of resistance to chemotherapeutic agents

85 Sulfonamides

86 Quinolones

87-88 β-Lactam antibiotics

89 Aminoglycosides

90 Macrolides and ketolides

91 Tetracycline and chloramphenicol

92 Oxazolidinones, streptogramin and other antibiotics

93 Antimycobacterial drugs, antitubercular drugs; treatment of MDR and XDR tuberculosis

94 Antileprosy drugs

95 Antifungal drugs

96 Antimalarial drugs

97 Antiamoebic and other antiprotozoal drugs

98 Drugs used in filariasis and kalaazar

99 Anthelmintic agents

100-101 Antiviral, anti-AIDS drugs

102 Chemotherapy of Urinary tract infection & STDs

103 Basic principles of cancer chemotherapy*

(XIII) Immunopharmacology

104 Vaccines, immunomodulators and treatment of transplant rejection disorders

(XIV) Miscellaneous Topics

105 Vitamins, nutraceuticals and probiotics

106 Drugs acting on skin and mucous membrane

107 Pharmacology of Diagnostic agents

108 Paediatric pharmacology

109 Geriatric pharmacology

110 Pharmacology of chelating agents

* Desirable to know

EVALUATION

Theory (150 marks) (Paper I – 75, Paper II – 75), Internal assessment - 20

Practical (80 marks) (Pharmacy – 10, Experimental – 10, Clinical Pharmacology – 30, OSPE (30), Internal assessment - 20

Viva-voce (30)

Pharmacy

1. Dosage forms, formulations, Sources of drug
2. Practical ORS, Benzyl benzoate emulsion, Mandl's throat paint, Whitfield ointment, Liniment turpentine, Lacto Calamine Lotion
3. Use of inhalers, nebulizers
4. Prescription writing

Experimental

1. Rabbit's eye
2. Guinea-pig ileum
3. CNS demonstrations
    a. Analgesic activity – Hot plate / tail-flick / writhing
    b. Sleeping time
    c. PTZ / Electroconvulsions
    d. Rotarod – diazepam
    e. Openfield locomotor activity

Clinical Pharmacology

1. Drug dose calculation
2. Drug advertisement
3. Rational use of drugs, drug prescribing for specific conditions
4. Clinical trial: use of caffeine on normal healthy volunteers
5. Therapeutic problems
6. P-drug
7. ADR monitoring

Communication Skills