M. Pharm. Clinical Research (1St Semester)

PRINCIPALS OF CLINICAL RESEARCH & CLINICAL TRIALS

(MPCR 102T)

Scope

After Completion of the course students should understand comprehensive procedure for the discovery of new drugs and how new drugs undergo various stages from bench to bed side before they are available in the market.

Objective

After completion of the course students should be able to understand,

- Drug Discovery process using various in vitro and in vivo techniques
- Clinical development of new drugs in various phases of Clinical of new drugs
- Good clinical practices, sponsors and investigators responsibility during the conduct of clinical trials
- Monitoring and safety of patents during the clinical trials
- Bioequivalence / Bioavailability studies of drugs

THEORY **60 Hrs**

1. **Drug Discovery and Development** 15 Hrs
   - Drug Discovery Process: Need for Systematic Approach in New Drug Discovery, Preclinical Drug Development
   - Investigational new drug application
   - Translation Research: Basic Research, Translation to Humans
   - Clinical Trails, Translational research Tools
   - In Vitro Methods of Drug Evaluation
   - Drug Discovery and Development of Biologics

2. **Basic Principles of Clinical Research** 15 Hrs
   - Clinical Development of New Drugs: International conference on Harmonization – Good clinical practice
   - Ethics Committee roles and responsibilities
   - Regulation for conducting clinical trials in India
   - Phases of Human Clinical Trials, Type of Trials
   - ICH-GCP Guidelines: Organization, Process of Harmonization, the principles of ICH-GCP
   - Sponsor's and Investigator's Responsibilities

3. **Safety and Medical Monitoring in Clinical Trials** 10 Hrs
   - Role and Responsibilities of a medical monitor in Clinical Trials
   - Patient Recruitment and Retention in Clinical Trials
   - Role of Clinical Research Coordinator (CRC) and Clinical Research Associate (CRA) in Clinical Trials

10 Hrs

4. **BA/BE Studies: Bioequivalence**
    - Therapeutic Equivalents
    - Elements of a bioequivalence study, Pharmacokinetic parameters, Statistical Analysis
    - Regulations of the Development and Clinical Trials of Biosimilars
    - Medical Devices: Regulations and Research
    - Conducting clinical Trials on medical devices
    - Medical device safety

10 Hrs

5. **Data management**
    - Data capture and collection, Case report form design, Clinical Database, Data review and validation, Discrepancy management
    - Biostatistics: Study objective, Study design, Randomization, Blinding, Sample Size

References:

1) Basic Principles of Clinical Research and Methodology by SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi
2) Ethical and Policy Issue in Research involving Human Participants. National Bioethics advisory commission. Bethesda, Maryland USA August 2001.
3) The Globalization of Clinical Trials. A Growing Challenge in Protecting Human Subjects. Janet Rehnquist, Inspector General Department of Health and Human Services, September200l
4) The European Agency for the Evaluation of Medical Products, ICH Topic E 6. Guideline for Good Clinical Practice. Note for guidance On Good Clinical Practice (CPMP/ICH/135/95))
5) A.T. Kearney. Fishing for Opportunities. Successful Clinical Trials Management. PharmaExec.Jun l, 200

M. Pharm. Clinical Research (1St Semester)

PHARMACOVIGILANCE –I

(MPCR 103T)

Scope

This subject deals with the safety monitoring of drugs during the clinical trials and after the drugs have been released in the market. Regulations for monitoring the safety of drugs in India and Globally.

Objectives

After completion of course student should be able to know about,

- Pharmacovigilance:- Its need and importance
- Signal detection
- Methods of Pharmacovigilance
- How to report, where to report and its further communication to regulatory agencies
- To know how the drugs are banned
- What is WHO programme for safety monitoring
- Tools that are used in Pharmacovigilance

THEORY 60 Hrs

1. **Pharmacovigilance** 12 Hrs
   - Safety Monitoring of Drugs
   - Historical Perspective
   - Common Terminologies Related to Pharmacovigilance
   - Objective of Pharmacovigilance

2. **Classification of Adverse Drug Reactions** 12 Hrs
   - Pharmacological Classification
   - Causality Classification
   - Severity Classification
   - Seriousness Classification
   - Frequency Classification
   - Mechanism Classification
   - Statistical Classification

3. **Methods of Pharmacovigilance** 12 Hrs
   - Passive surveillance
   - Spontaneous reporting
   - Case series
   - Stimulated reporting
   - Active surveillance

- Comparative observational studies
- Descriptive studies

12 Hrs

4. **Post Marketing Surveillance**
   - Methods of postmarketing surveillance
   - Periodic safety update report
   - Signal Detection Procedures Signal generation
   - Signal strengthening and Signal testing, evaluation and explanation.

12 Hrs

5. **World Health Organization (WHO)- Uppsala Monitoring Center**
   - Purpose of UMC, Functions of UMC
   - Pharmacovigilance in Different Countries
   - Pharmacovigilance Program of India (PvPI) including NHP
   - Commercially available ADR reporting software
   - Vigilance system for Medical Devices

References:

1) Drug Discovery and Clinical Research, SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
2) Textbook of Pharmacovigilance, SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
3) Bigoniya P. Pharmacovigilance of Herbal Medicines: Current Status and Future Strategies. The Pharma review 2009; 7:39
4) 45 US Department of Health and Human Services. Protection of human subjects, Code of federal regulations. Title 45, Part 46, Subpart D.
5) Indian Council of Medical Research. Ethical Guidelines for Biomedical research on Human participants.2008, 27-9.

M. Pharm. Clinical Research (1St Semester)

BIOETHICS & DRUG SAFETY IN CLINICAL TRIALS

(MPCR 104T)

Scope

The subject deals with the Ethics for the participants who are undergoing clinical trials in order to avoid unethical practices. The students should know what are the process for the conducting clinical trials using best ethical practices and regulations for ethics committee.

Objective

After completion of the course students should be able to understand,

- Basic principles of Bioethics
- Responsibilities of Ethics Committee
- Inform consent process
- Principles for including vulnerable populations
- Administration and Management registration, accreditation OECS.

THEORY 60 Hrs

1. Statement of General Principles 12 Hrs
   General Ethical Issues: Benefit-risk Assessment, Informed consent process, Privacy and Confidentiality, Distributive justice, Payment of participation, Compensation for research-related harm, Conflict of Interest, Selection of Vulnerable and special groups as research participants, Community engagement, Postresearch access and Benefit sharing

2. Responsible Conduct of Research: Values of research, Policies, Planning and Conducting research – specific issue, Reviewing and Reporting research, Responsible authorship and publication, Registration with clinical trials registry – India, Collaborative research, Responsibilities of ethics committees, research & institution, International collaboration 12 Hrs

3. Ethical Review Procedures: Terms of Reference (TOR) for ECs, Special situation, Composition of EC, TOR for EC members, Roles and Responsibilities of EC, Submission and Review procedures, Full committee meeting, Site monitoring, Record keeping and Archiving, Administration and Management, Registration and Accreditation of ECs 12 Hrs

4. Informed Consent Process: Essential information for prospective research participants, Responsibility of Researcher, Documentation of informed consent process, Waiver of consent, Special situations, Consent for studies using deception 12 Hrs
   Vulnerability: Principles of research among vulnerable populations, Additional safeguards/ protection mechanisms, Women in special situations, Children, Research involving sexual minorities and sex workers, Research among tribal, mental illness or cognitively impaired/ affected individuals, Patients who are terminally III, Other Vulnerable groups

12 Hrs

5. Clinical Trials of Drugs and Other Interventions: Clinical drug/vaccine development, Bioavailability/Bioequivalence study, Ethical implications of study designs, Multicentric trials, Device trials, Biological and Biosimilars, Clinical trials with stem cells, Surgical interventions, Clinical trials of interventions in HIV/AIDS, Trials of Diagnostic agents, Radioactive materials and X-rays, Investigator initiated clinical trials, Clinical trials on contraceptives, Pregnancy and Clinical trials, Clinical Trials in Oncology, Clinical trials of product using any new technology, Synthetic Biology

References:

1) Drug Discovery and Clinical Research, SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
2) Textbook of Pharmacovigilance, SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
3) Bigoniya P. Pharmacovigilance of Herbal Medicines: Current Status and Future Strategies. The Pharma review 2009; 7:39
4) 45 US Department of Health and Human Services. Protection of human subjects, Code of federal regulations. Title 45, Part 46, Subpart D.
5) Indian Council of Medical Research. Ethical Guidelines for Biomedical research on Human participants.2008, 27-9.
6) Hand book of clinical pharmacokinetics- Gibaldi and Prescott.
7) Clinical pharmacology by Melmon and Morrelli.
8) Clinical trials and tribulations by Allen E. Cato.
9) Text book of therapeutics- drug, disease and management by Herfindal and Gourley.
10) Hand book of clinical research-Julia Llyod& Ann Raven Ed. Churchill Livingstone
11) CDSCO. GCP- guidelines for Clinical trials on pharmaceutical products in India.
12) New Delhi: Ministry of Health;2001
13) ICH of technical requirements for registration of pharmaceuticals for human use. ICH
14) Harmonized Tripartite Guideline. Guideline for GCP.E6
15) Ethical Guidelines for Biomedical Research on Human Subjects 2000. ICMR, NewDelhi

Syllabus

Syllabus for M.Pharm Clinical Research

Semester II

Introduction to Pharmacoeconomics and Outcomes Research

Paper I – MPCR 201 T

Scope

After Completion of the course students should be able to understand the basic principles of Pharmacoeconomics i.e. to find out the best therapy at affordable cost, which should be based on patient reported outcomes.

Objective

After completion of the course students should be able to understand,

- Pharmacoeconomics
- Health Technology Assessment
- Systematic Review and Meta-Analysis in Evidence Based Medicines
- Patient Reported Outcomes Research

THEORY 60 Hrs

1. **Pharmacoeconomics** 10 Hrs
   - Principles of Pharmacoeconomics
   - Definitions, Perspectives & Costs
   - Methods & Applications of Pharmacoeconomics
   - Clinical pharmacy service evaluation
   - Strategies to incorporate pharmacoeconomics into pharmacotherapy
   - Conduct of pharmacoeconomics evaluation

2. **Health Technology Assessment** 10 Hrs
   - Introduction to HTA
   - Definitions & Importance of HTA
   - HTA process in different countries
   - Drug reimbursement policies in various countries
   - Health Economic evaluation: challenges and methodological issues for priority setting universal health coverage

3. **Systematic Review and Meta –Analysis in Evidence Based Medicines** 10 Hrs
   - Objectives of systematic review
   - Role and rationale for doing meta-analysis
   - Essential features of systematic review & meta-analysis
   - Significance of systematic review & meta-analysis
   - Methods to write a systematic review

- Merits and demerits of systematic review and meta-analysis

10 Hrs

4. **Patient Reported Outcomes Methods**
   - Introduction to Patient Reported Outcomes (PROs) Assessment-Development and validation
   - Patient preference methods
   - Establishing the content validity of PRO instruments
   - Patient preference methods used for QALYs

5. **Health Economics and Outcomes Research (HEOR)** 10 Hrs
   - Introduction to HEOR
   - Healthcare costs categories
   - Methods of HEOR Analysis
   - HEOR as a guide to policy makers

6. **Role of HEOR in Drug Development Process** 10 Hrs
   - Challenges & Opportunities for reimbursement and market access within biopharma research
   - Current and future uses of HEOR data in healthcare decision making in the US

References:

1. Moher *,Larissa Shamseer 1,Mike Clarke2,Davina Gheris3, Alessandro Liberati,Mark Petticrew4,Paul Shekelle5,Lesley A Stewart6 and PRISMA-P Group; Moher et al; Preferred reporting items for systematic review and meta-analysis protocols(PRISMA-P)2015 statement, Systematic Reviews2015 4:1
2. SUNY Downstate EBM Tutorial ;available athttp://library downstate.edu/EBM2/research.htm
3. AK Akobeng;Understanding systematic reviews and meta-analysis Community child health, public health and epidemiology; Arch Dis Child 2005;90:845-848

Syllabus for M.Pharm Clinical Research

Semester II

Clinical Research Methodology

Paper II – MPCR 202 T

Scope

After Completion of the course students should be able to understand various practical aspects of conduct a Clinical Trials. How to implement a clinical trial and its management.

Objective

After completion of the course students should be able to understand,

- What are the requirements for doing a good clinical project
- Documents required for a clinical trial project
- Inspection during the clinical trial
- Regulation of conducting clinical trial for biosimilars and medical devices.

60 Hrs

THEORY

10 Hrs

7. **Clinical Trial Documents**
   - Protocol designing
   - Investigator's brochure
   - Preparation & Amendments of ICF & CRF's
   - Importance of SOPs in clinical trial

10 Hrs

8. **Clinical Trial Inspection and Audit**
   - Types of audit
   - Preparation for audit
   - Regulatory requirements for audit
   - Clinical quality assurance audit

10 Hrs

9. **Clinical Trial Outsourcing**
   - Scope and role of CROs/SMO
   - Concept of outsourcing
   - Evaluation of time & cost for outsourcing

10 Hrs

10. **Project Management in clinical Trials**
    - Selection of clinical trial site
    - Investigator identification
    - Volunteers selection criteria & recruitment
    - Within-trial decisions e.g. code breaking, premature termination, monitoring & source documents verification

- Adverse event monitoring & expedited reporting of SAEs
- Data safety monitoring board
- Site monitoring visit
- Clinical trial report

11. Clinical Data Management 10Hrs

- History of Clinical Data Management
- Overview of Clinical Data Management
- Data Management plan
- Data capture & collection
- Case report form design
- Clinical database
- Database review and validation
- Discrepancy management and data closure

12. Essentials of Medical writing 10Hrs

- Fundamentals of good medical writing
- Types of Medical writing
- Types of Research publication
- Requirements for writing research articles

References:

1. Drug Discovery and Clinical Research by SK GUPTA, Jaypee Brothers Medical Publishers (p) ltd. Second Edition New Delhi
2. The Belmont Report Ethical Principles and Guidelines for the Protection of Human Subjects of research. Available at:http://www.nmmu.ac.za/documents/rcd/The%20Belmont%20report.pdf(1979).(accessed:November 2009)
3. Indian council of Medical research Ethical guidelines for biomedical research on Human Participants.2008, 27-9.
4. 45 US Department of health and Human Service. Protection of Human Subjects. Code of Federal Regulations Title 45,Part 46,Sub Part D

   Washington, DC: US Department of Health and Human Services, (revised Jan 2009)

Syllabus for M.Pharm Clinical Research

Semester II

Regulatory Affairs in Clinical Research

Paper III – MPCR 203 T

Scope

After Completion of the course students should be able to understand various regulations in India and other Countries to conduct a Clinical Trials. How to implement a clinical trial as per drugs and cosmetic act and in developing world.

Objective

After completion of the course students should be able to understand,

- Drug & Cosmetic Act
- Regulations for conducting Clinical trials
- Clinical Research Related Guidelines
- Practical Input of International Bodies
- Regulations for the Development and Clinical Trials of Biosimilars and Medical Devices

THEORY 60 Hrs

13. **Drug & Cosmetic Act** 10 Hrs

14. Regulations for Conducting Clinical trials 10 Hrs

- USA: Process of IND submission, NDA, Application for approval of a generic drug product (ANDA 505j), BLA
- UK: MHRA
- EU: Centralised procedure, Decentralized process, Mutual Recognition Procedure
- India: Schedule Y

10 Hrs

15. Clinical Research Related Guidelines

- Good clinical practice guideline (ICH GCPE6)
- Indian GCP guidelines
- ICMR Ethical guidelines for biomedical research

10 Hrs

16. **Practical Input of International Bodies**

- WMA
- CIOMS
- ICH

17. Regulations for the Development and Clinical Trials of Biosimilars 10Hrs

- Guidelines and Regulations
- Development and Quality aspects
- Safety and Efficacy, Clinical Development
- Principles for Development of Biosimilars
- Data requirements for Preclinical studies and Clinical trial application

18. Medical Devices: Regulations and Research 10Hrs

- Phases in the lifespan of a medical devices
- Conducting clinical trials on medical devices
- Medical devices regulations across the world

References:

5. Drug Discovery and Clinical Research by SK GUPTA, Jaypee Brothers Medical Publishers (p) ltd. Second Edition New Delhi
6. The Belmont Report Ethical Principles and Guidelines for the Protection of Human Subjects of research. Available at:http://www.nmmu.ac.za/documents/rcd/The%20Belmont%20report.pdf(1979).(accessed:November 2009)
7. Indian council of Medical research Ethical guidelines for biomedical research on Human Participants.2008, 27-9.
8. 45 US Department of health and Human Service. Protection of Human Subjects. Code of Federal Regulations Title 45,Part 46,Sub Part D

   Washington, DC: US Department of Health and Human Services, (revised Jan 2009)

Syllabus for M.Pharm Clinical Research

Semester II

Pharmacovigilance-II

Paper IV – MPCR 204 T

Scope

Overall objective is to familiarise the students with the objectives of Pharmacovigilance to ensure the safety of patients and their methods of analysing ADRs.

Objective

After completion of the course students should be able to understand,

- Benefit Risk Assessment in Pharmacovigilance
- Pharmacovigilance regulations in various countries
- Good Pharmacovigilance practice
- Pharmacovigilance of herbal drugs

60 Hrs

THEORY

19. Benefit Risk Assessment in Pharmacovigilance — 10 Hrs

- Definitions, Three Principles
- Adverse health effect
- Actual versus perceived benefits and risk
- Turbo model, Factor effecting benefit risk balance
- Stepwise approach to Benefit Risk Assessment

20. Pharmacovigilance Regulations in various countries — 10 Hrs

- UK
- Europe
- USA
- India

21. Good Pharmacovigilance Practice (GPVP) — 05 Hrs

22. Setting up of a Pharmacovigilance Center — 05 Hrs

23. Pharmacovigilance of Herbal Drugs — 10Hrs

24. Computer Based System Approach — 10Hrs

- Background
- Methods of Safety data analysis
- Informatics in Pharmacovigilance

- Computer bases tools for Pharmacovigilance

25. Vigilance Systems for Medical Devices 10 Hrs

- Medical device regulations and need of Harmonization
- Medical device regulations
- Medical device market: focusing BRICS

References:

1) Drug Discovery and Clinical Research (2nd Edition), SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
2) Textbook of Pharmacovigilance (2nd Edition), SK Gupta, Jaypee Brothers Medical Publishers (P) Ltd.
3) Bigoniya P. Pharmacovigilance of Herbal Medicines: Current Status and Future Strategies. The Pharma review 2009; 7:39
4) 45 US Department of Health and Human Services. Protection of human subjects, Code of federal regulations. Title 45, Part 46, Subpart D.
5) Indian Council of Medical Research. Ethical Guidelines for Biomedical research on Human participants.2008, 27-9.