University-Sudan

Faculty of Graduate Studies and Scientific Research

Faculty of Clinical and Industrial Pharmacy

M.Sc. Hospital Pharmacy

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Introduction

M.Sc. Hospital Pharmacy is an advanced unique program in Sudan designed for pharmacists working in hospitals and community pharmacies to enhance their clinical pharmacy knowledge and practice skills in applying drug therapies. It deals with the application of drug treatments to patients in hospital or clinical settings. The program is strictly designed to cater for wise administration of medications to secure and ensure the safety and health of patients.

General objective

The M.Sc. Hospital Pharmacy program prepares students for successfully executing the tasks of hospital pharmacist.

Specific objectives

The program is designed to equip the students with:

- Knowledge of characteristics, side-effects, route of administration, interactions, stability and doses of drugs used in hospitals.
- Ability to evaluate a patient's drug use in relation to the pathology.
- Skills of preparation and pharmaceutical formulation of drugs.
- Knowledge of principles of sterilization.

Expected learning outcomes

Upon graduation from the program, students will be able to:

- Choose, prepare, store, compound, and dispense medicines and medical devices.
- Advise healthcare professionals and patients on safe, effective and efficient use of drugs.
- Provide services to patients and health care professionals in hospitals.
- Provide pharmaceutical services for hospitals and hospital pharmacists.
- Manage complex clinical problems.

Admission requirements

- Applicant must satisfy the general regulations set by the faculty of graduate studies and scientific research of the National University-Sudan for registration for master degrees.
- Eligible candidates are:
  (a) Holders of B.Sc. Pharmacy from the National University-Sudan.
  (b) Holders of B.Sc. Pharmacy from any other accredited university or a college with grade Good minimum or with cGPA 2.5 out of 4.0 or cGPA 3.00 out of 5.0
  (c) Priority is reserved for candidates working in hospitals

Study program

Semester One

Code	Course	Credit Hours	Contact Hours	
			Theory	Practical
MCH-611	Research Methodology	2(2+0)	2	0
MCH-612	Biostatistics	2(2+0)	2	0
MCH-613	Pharmacoinformatics and Communication Skills	2(2+0)	2	0
MCH-614	Pharmacoepidemiology	2(2+0)	2	0
MCH-615	Molecular Pharmacology	2(2+0)	2	0
MCH-616	Pharmacotherapy in Patient Care	2(2+0)	2	0

Semester Two

Code	Course	Credit Hours	Contact hours)	
			Theory	Practical
MCH-621	Hospital Pharmacy Services	2(2+0)	2	0
MCH-622	Pharmacoeconomics and Hospital Supply Management	2(2+0)	2	0
MCH-623	Dosage Form Design and Biopharmaceutics	2(2+0)	2	0
MCH-624	Pharmaceutical Chemistry and Analysis	1(1+0)	1	0
MCH-625	Advanced Clinical Pharmacy	2(2+0)	2	0
MCH-626	Current Developments in Health and Biotechnology	1(1+0)	1	0
MCH-627	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	2(2+0)	2	0

Semester Three

Code	Course	Credit Hours	Contact hours	
			Theory	Practical
MCH-631	Clerkship of Internal Medicine: Cardiology and Pulmonary	2(1+1)	1	2
MCH-632	Clerkship of Surgery and Critical Care	1(0+1)	0	2
MCH-633	Clerkship of Endocrinology	1(0+1)	0	2
MCH–634	Clerkship of Obstetrics and Gynecology	1(0+1)	0	2
MCH-635	Clerkship of Pediatrics	1(0+1)	0	2
MCH-636	Clerkship of Psychiatric	1(0+1)	0	2
MCH-637	Clerkship of Oncology	1(0+1)	0	2
MCH-638	Clerkship of Total Parenteral Nutrition	1(0+1)	0	2
MCH-639	Clerkship of Extemporaneous Compounding	1(0+1)	0	2

Semester Four

Code	Course	Credit Hours	Contact hours)	
			Theory	Practical
MCH-641	Clinical Research	1(1+0)	1	0
MCH-642	Journal Club	1(1+0)	1	0
MCH-643	Dissertation	9(6+3)	6	6

Courses contents

MCH-611 Research Methodology

Introduction to epidemiology; Study design; Bias; Meta-analysis and critical appraisal; Experimental design; Survey methods; questionnaires, interviews, unstructured interviews, focus groups; Sampling and samples sizes; Hypothesis testing; Statistical analysis; Correlations and regression; Chi-square distribution; Analysis of variance and non-parametric statistics; Report writing.

MCH-612 Biostatistics

Variables: definition , types: dependent, independent, confounded; Measurement of variables, validity; Types of validity: internal, constructs validity, external, threats ; Types of research: observational, archival, case study, meta-analysis and critical appraisal; Experimental design: True and quasi-experiments; Survey methods: questionnaires, interviews, unstructured interviews and focus group; Types of samples: purposive, convenience and probability; Hypothesis testing; Statistical analysis; Correlation and regression; Chi-square distribution; Analysis of variance and non-parametric statistics.

MCH-613 Pharmacoinformatics and Communication Skills

Introduction to drug information resources; Query answering and documentation; Critical evaluation of drug information and literature; Primary, secondary and tertiary source; Preparation of written and verbal reports; Establishing drug information center; Poisons information-organization and information resources; Poisons management in drug dependence and drug abusers: opiates, cocaine, amphetamine, alcohols, benzodiazepines, barbiturates, tobacco; Evidence base medicines: Formulating clinical questions; searching best evidence, critical appraisal of the evidence, applying evidence to the patients, evaluation; Drug monographs.

MCH-614 Pharmacoepidemiology

Definitions of terms and aims of Pharmacoepidemiology; Outcomes of drug use measure; Systems for testing drug effects in populations; Advantages and disadvantages of

Pharmacoepidemiological models; Variations in disease by: time, place and person; Sources of data: incidence, prevalence and others; Causation: bias, confounding and effect modification; Randomized controlled trials; drug trials, cohort studies, case-control studies, cross-sectional studies, hybrid designs, prescription event monitoring; Selected applications of pharmacoepidemiology: hospital pharmacoepidemiology, drug induced birth defects, vaccine safety; concept of risk, relative risk, odds ratio, absolute risk reduction, number to treat, attributable risk; Pharmacoepidemiological methods: Drug utilization review, survey of drug use, case series and reports, Drug use measures: number of prescription, prescribed daily dose, defined daily dose.

MCH-615 Molecular Pharmacology

Drug receptors and cell signaling; Agonist and antagonist action: affinity, efficacy, spare receptors Schild plots, Signal transduction mechanisms: cAMP, IP3, DAG, cGMP/NO; Molecular biology of drug receptors; Receptors structure/function relationship; Molecular biology of ion channels; Pharmacology of smooth muscle and its autonomic input; Mechanisms causing contraction in smooth muscle; Transmitter release from autonomic nerve ganglia; Mechanisms of muscles relaxation; Clinical use of drugs acting on smooth muscles.

MCH-616 Pharmacotherapy in Patient Care

Pharmacotherapy instructions: dosage calculations, adverse reactions, drug interactions, relevant pharmacokinetics, alternative therapies and monitoring parameters; Pathophysiology and treatment of various disease state modules; Specific modules systemic pharmacology: cardiovascular (including, hypertension, chronic cardiac failure, ischemic heart disease, hyperlipidaemia); Musculoskeletal disorders: respiratory (asthma, chronic obstructive pulmonary disease) Gastrointestinal diseases; Hematological disorders; Musculoskeletal: osteoarthritis, rheumatoid arthritis, pain; General medical conditions 1-stroke, atrial fibrillation.

MCH-621 Hospital Pharmacy Services

Health Care Economics; Organization and Management Process; Quantitative Techniques for Management; Pharmacy Services Marketing; Communication and report writing in hospitals; Accounting for decision making; Financial management; Supply chain management; Hospital management control systems; Quality management in hospitals; Health care and insurance; Legal and ethical issues; Hospitals and pharmaceutical management.

MCH-622 Pharmacoeconomics and Hospital Supply Management

Terminology; Costs and outcomes used in pharmacoeconomic evaluations; Methodologies for pharmacoeconomic evaluations: case-minimization, cost benefit, cost effectiveness, cost utility, health insurance and medical insurance; Quality of Life (QOL) and Quality Adjusted Life Years (QALY); Decision analysis; Develop a systematic method for evaluating pharmacoeconomic studies; Management of drug supply and procurement; Managing medicine selection; Treatment guidelines and formulary manuals; Managing procurement; Quality assurance for pharmaceuticals; Quantifying pharmaceutical requirements; Managing tender processes;

Managing distribution; Inventory management; Importation and port clearance; Transport management.

MCH-623 Dosage Form Design and Biopharmaceutics

Routes of drug administration; Concepts of biopharmaceutics; Calculation of drug doses: extemporaneous compounding of simple mixtures, basic physicochemical principles preparation of dosage forms; Introduction to basic facts related to information on liquid and solid materials; Properties of solutions; Principles of solutions formations from solutes and solvents; Factors affecting dissolution process; Disperse systems: colloids, suspensions, and emulsions; Mathematical characterization of absorption, distribution and elimination of drugs; Body compartments: one and two compartments; Pharmakinetics parameters: half-life, T_{max} and C_{max}; Bioavailability of drugs.

MCH-624 Pharmaceutical Chemistry and Analysis

Introduction to techniques of separation; Qualitative and quantitative analysis of pure and formulated drugs: titrimetric assays, UV-Vis spectrophotometry, infrared (IR) spectroscopy, nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry; Major chemical routes of drug degradation; Strategies of drug curtail; Degradation kinetics; Drug shelf-life; Quality control for drugs and drug products: complementary medicines and associated pharmacopoeial requirements.

MCH-625 Advanced Clinical Pharmacy

Accurate and effective communication: building and maintaining effective relationships, limitations and consultation models**;** Medication review in patients with multiple pathology and multiple drugs; Identification, categorization and documentation of care issues and actions; Relevant sources**;** Utilization and limitations of medicines and patient information; Keeping medical records; Clinical management plans; Monitoring response: physical examination, modifying treatment., Use of common diagnostic aids; Legal, regulatory, ethical and professional frameworks; Professional relationships and communication with healthcare professionals and patients; Role and function of team members; Reflective practice: continuous professional development; Drug formularies: definition, purpose of formularies in promoting rational drug use, factors influencing selection of drugs formulary; Methods of implementing drug formularies; Clinical guidelines: definition**,** purpose, advantages, disadvantages and factors influencing validity of clinical guidelines; Guidelines development.

MCH-626 Current Developments in Health and Biotechnology

Emerging public health issues; Emerging pharmaceutical technologies; New human genome project; Genome implication on pharmacotherapy; Novel therapeutic agents for combating infectious disease; Development of novel drug delivery platforms.

MCH-627 Clinical Pharmacokinetics and Therapeutic Drug Monitoring

Maximum and minimum plasma concentration; Selecting The appropriate equation; Interpretation of primary pharmacokinetics parameters and their effect on of plasma drug concentration-time profile; Creatinine clearance; Drugs dialysis; Drug monographs: aminoglycosides, digoxin, carbamazepine, phenytoin…; Absorption and distribution kinetics; Therapeutic regimens; Individualization of therapy; Factors affecting individualization of therapy: variability, genetics, disease, age, weight and interacting drugs; Concentration monitoring; Distribution kinetics; Metabolite kinetics; Turnover concepts; Pharmacokinetics drug interactions during metabolism and excretion; Assessment of AUC; Urine data for estimation of half-life **;** Estimation of absorption kinetics from plasma concentration; Distribution of drugs extensively bound to plasma proteins, Indications for TDM and protocol of TDM; Effect of renal impairment in pharmacokinetics; Effect of hepatic disease on pharmacokinetics.

MCH-631 Clerkship of Internal Medicine: Cardiology and Pulmonary

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-632 Clerkship of Surgery and Critical Care

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-633 Clerkship of Endocrinology

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-634 Clerkship of Obstetrics and Gynecology

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-635 Clerkship of Pediatrics

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-636 Clerkship of Psychiatric

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-637 Clerkship of Oncology

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-638 Clerkship of Total Parenteral Nutrition

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-639 Clerkship of Extemporaneous Compounding

Components of a case history; Principles of therapeutics; Disease major pathological processes; Clinical relevance of biochemical treats; Pathophysiology**;** Drugs used: modes of action, ADR_s and contraindications; Pharmacological and non-pharmacological management of diseases.

MCH-641 Clinical Research

Practice-based clinical research; Writing research project proposals; Ethics in research; Ethical clearance; Qualitative and quantitative researches; Data collection, management **MCH-** and answer clinical questions; Literature review for validity and clinical utility; Use electronic and paper based resources for patient care; Search relevant databases for current best evidence.

MCH-642 Journal Club

Formulate and answer clinical questions; Literature review for validity and clinical utility; Use electronic and paper based resources for patient care; Search relevant databases for current best evidence

MCH-643 Dissertation

Write a research proposal; Conduct a piece of research: Data collection, analysis, interpretation and presentation. Dissertation writing: abstract, introduction, literature review, methodology, results, discussion, conclusions and recommendations, references. Dissertation assessment; Dissertation oral examination

Human resources and facilities

Teaching staff: Four professors

Two associate professors

Ten assistant professors

Four lecturers

Facilities: One lecture room: 118 seats

One lecture room: 134 seats

Two computer labs: 240 seats

National university library: 400 seats

E- library: 250 seats

Duration of the program: Four semesters 16 weeks each

Teaching modules

Lectures, tutorials, seminars, workshops and clinical rounds

Teaching Language: English

Examinations regulations

- Abide by the examinations rules of the general regulations of the graduate studies of the National University-Sudan

Assessment:	Written examination	60 %
	Seminars and tutorials	30 %
	Assignments and laboratory classes	10 %

Grading system: A (80-100) B^+ (75-79) B (70-74**)** C^+ (65-69) C (60-65) F (< 60)

Award of the degree

The Scientific Council of the National University, based on the recommendation of the board of the of Faculty of Graduate Studies and Scientific Research, shall award the successful candidate

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