

ZIAUDDIN UNIVERSITY KARACHI, PAKISTAN
CURRICULUM
MD Radiotherapy (Clinical Oncology)

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INTRODUCTION

MD Programme in Radiotherapy (Clinical Oncology)

Subsequent to the approval granted by Pakistan Medical and Dental College Karachi, it has been decided to start MD programmes in the field of radiotherapy at the Department of Oncology, Ziauddin University, Karachi. A comprehensive Residency Training Programme in Radiotherapy (Clinical Oncology) has been designed to graduate well trained oncologists with high professional competence in modern diagnostic and therapeutic approach in the management of oncological diseases. The specialty of radiotherapy (clinical oncology) involves all aspects of the management of patients with malignant disease, from diagnosis through treatment with both radiotherapy and systemic therapies to management and symptom control in advanced and recurrent disease.

The four-year scheme residency training programme shall fulfill the following objectives:

- To produce well-qualified clinical oncologists and radiotherapists to meet the need of increasing demand of oncological services.
- To provide comprehensive teaching and training in all subjects related to clinical oncology and radiotherapy and oncologically-related diseases.
- To provide a structure overview of the theory and practice of clinical oncology including the principles of surgical oncology, medical oncology and radiation oncology. The emphasis will be placed on multi-disciplinary approaches to patient management using the Hospital's specialized unit structure.

The syllabus is stated in general terms as the relevant topics are continually advancing and candidates and faculty will be required to keep themselves aware of new developments. In the first 2 years, it is planned to offer a minimum of 175 hours of instruction including lectures, tutorials and practicals, according to the following distribution:

Subject	Hours
Cancer Biology and Radiobiology	15 Hrs.
Clinical Pharmacology	20 Hrs.
Medical Statistics	15 Hrs.
Oncological Science	120 Hrs.

Subject	Hours
Physics	54 Hrs.

For clinical oncology experience for the next 2 years, the candidates will be rotated in other relevant departments and certain other reputed facilities of the country.

Objectives

In Pakistan, the facilities for management of patients with malignancies are not significant. There is also an extreme shortage of trained personnel. To overcome these deficiencies, Ziauddin University has embarked to initiate MD programme in the field of Radiotherapy at the Department of Oncology.

After pursuing the programme of study and training for a period of 4 years, the enrolled candidates are expected to attain high professional competence in modern diagnostic and therapeutic approach in the management of oncological diseases and will become eligible for the final examination leading to MD.

Training

The 4-year training program in radiotherapy (clinical oncology) will include a minimum of 2 years full-time clinical training in the diagnosis and management of a broad spectrum of neoplastic diseases. Full-time clinical training means that at least 80% of the trainee's professional time and effort during a standard working week is dedicated to clinical activities (patient care or education). These may include the primary care of cancer patients, supervision of cancer patients on the general medical service or in designated medical oncology in-patient units, oncologic consultations and consultation rounds, oncology ambulatory care, scheduled clinical conferences, performance of procedures on patients, review of imaging, pathology, and other diagnostic materials, other direct patient care, attending national and international scientific meetings, and reading relevant literature.

Clinical activities may also include research involving patient contact, care, and treatment. Research experience for 1 or more years, including international training, will be strongly encouraged, especially for the oncologists who want an academic career.

Place of Training

The programme of study and training will be conducted at the Department of Oncology, Ziauddin Cancer Hospital.

A short term exchange training facility would also be arranged at the other approved institutions of the country.

Eligibility Criteria

A candidate will be eligible for induction into the programme provided the following conditions are fulfilled:

- Should possess degree of MBBS or equivalent from a recognized university with one year house job experience.
- Should hold valid registration with PMDC.
- Has passed Selection Examination and cleared Interview.
- Has agreed to accept full-time on-the-job training.
- Shall abide by the rules and regulations of this University.

Evaluation

- Internal evaluation of the candidates will be carried out every 4 months with examination papers consisting of MCQ's and subjective questions. The evaluation will be added to the final evaluation.
- At the end of 2 years an internal examination would be conducted to evaluate the competency of the candidates. The evaluation will be added to the final evaluation.
- The final examination will be held at the end of four years training programme consisting of theory, clinical examination and defense of thesis.
- The candidate will be eligible to take final examination provided his thesis is accepted and one paper and one review article is published in PMDC approved Journal.
- The candidate will be permitted one Final Examination and 2 Re-sit Examination.

Educational Set-up

Programme Leader

The programme leader fully committed to the training programme and related activities will be based at the primary training site.

The trainees will be required to maintain a record of training. The programme leader will countersign it, as appropriate, to confirm the satisfactory fulfillment of the required training experience and the acquisition of the competencies that are cumulated in the

specialty curriculum. It will remain the property of the trainee and must be signed at the annual assessments. The assessment of the trainee will be based on the standard format of annual reviews.

Faculty

Faculty Members

The radiotherapy (clinical oncology) programme faculty will include a minimum of three full-time qualified teaching faculty members, including the program leader. All the faculty members will be certified in radiotherapy (clinical oncology) or possess equivalent qualifications, and each of them will devote substantial time (at least 10 hours per week) to teaching, research, administration, and/or the critical evaluation of the performance, progress, and competence of the trainees.

Faculty Standards

The teaching staff will demonstrate an interest in teaching, and set an example for trainees by documented engagement in the following pursuits:

- Actively sharing in a clinical oncology practice
- Continuing his/her own medical education
- Active membership in regional, national and international scientific societies
- Active participation in research
- Presentation and publication of scientific studies

Educational Programme

The educational programme will be organized to provide training and experience at a level high enough for the trainee to acquire the competency of a specialist in the field. The programme will emphasize self-instruction, development of critical analysis of clinical problems, and the ability to make appropriate decisions. Appropriate supervision of the trainees will be provided for the duration of their educational experience.

Educational Environment

The training programmes will provide an intellectual environment for acquisition of the knowledge, skills, clinical judgment, and attitudes essential to the practice of radiotherapy (clinical oncology).

Professionalism Ethics

Professionalism will be fostered during radiotherapy (clinical oncology) training. In addition to mastering the comprehensive clinical and technical skills of the consultant clinical oncologist, trainees are expected to maintain the values of professionalism. These values include:

- Placing the needs of one's patient ahead of one's self-interest
- Being responsive to the needs of society
- Maintaining a commitment to scholarship and high standards of related research

Trainees, therefore, will be encouraged to participate in professional organizations, community programmes, and institutional committees.

Available Institutional Facilities

Clinical Setting

The clinical setting includes opportunities to observe and manage patients with a wide variety of neoplastic diseases on an in-patient and out-patient basis. The trainee will have the opportunity to assume the continuing responsibility for both acute and chronically ill patients in order to learn the natural history of cancer, the extent of the effectiveness of the various therapeutic programmes, and how to impart information to the patient, including bad news.

Hospital Facilities

Modern in-patient, ambulatory care, and laboratory facilities necessary for the overall educational programmes are available and functioning. Adequate pathology services, modern diagnostic radiology services, resources for nuclear medicine imaging, blood banking and blood therapy facilities, and facilities for clinical pharmacology and tumor immunology are available at the training site. A general surgical service and its support are also available, in addition to access to radiation therapy.

The program also includes:

- Attendance at a multidisciplinary tumor conference
- Clinical cancer protocol studies applied according to the guidelines for good clinical practice

Update of Skills and Knowledge

Having obtained certification in radiotherapy (clinical oncology), the specialist is expected to update the acquired skills and knowledge by participating in Continuing Medical Education programmes such as courses, symposia or self-learning processes on a regular basis.

Perception of Other Specialties

The support of oncology nursing, pharmacy, rehabilitation medicine, palliative care medicine, and dietetic and psychosocial services are available so that the trainee can perceive the role of other specialties in the total care of the cancer patient.

The Curriculum

CANCER BIOLOGY & RADIOBIOLOGY CURRICULUM (15 Hrs.)

Summary

An understanding of carcinogenesis, cellular and molecular features of malignancy, including biochemical control, signaling and cell death. Tumor development, growth kinetics, micro-environmental changes, metastasis and immune response. Common laboratory techniques to demonstrate these features. A knowledge of the cellular and molecular basis for the response of cells, tissues and tumors to ionizing radiation and chemotherapy. A knowledge of current models of radiation response and the biological principles underlying the application of radiotherapy to the treatment of disease, including normal tissue responses.

CLINICAL PHARMACOLOGY CURRICULUM (20 Hrs.)

Summary

The emphasis is on cytotoxic drugs, hormones and biological therapies used in clinical practice, their mode of action and side-effects. The syllabus also includes the basic principles of pharmacokinetics and pharmacodynamics, clinical trials and the basic pharmacology of drugs used in the supportive care of patients with cancer.

MEDICAL STATISTICS CURRICULUM (15 Hrs.)

Summary

Candidates will be required to have sufficient knowledge of the principles of the subject to enable them to study critically the statistical validity of published investigations. Particular emphasis is placed on candidates acquiring sufficient knowledge of the subject to enable them to appreciate the requirements needed to design, monitor and assess clinical trials and epidemiological studies.

ONCOLOGICAL SCIENCE (120 Hrs.)

Basic Scientific Principles

As a foundation for treating malignant disease, the candidate is required to understand the biology of cancer, principles of therapy, and proper conduct and interpretation of clinical research.

This includes:

- In-depth familiarization of cancer biology and the basic processes of carcinogenesis
- Tumour immunology and the regulatory action of cytokines on the immune system
- Etiology of genetic and environmental factors in oncogenesis
- Epidemiologic factors and descriptors of disease
- Principles and indications for genetic screening
- Knowledge of the design and conduct of clinical trials along with the ethical, regulatory, and legal issues involved
- Capability to adopt multidisciplinary approach with integration of the various subspecialties in the management and treatment of malignant diseases
- Ability to review biopsy material and surgical specimens with a pathologist and familiarize with newer pathologic techniques helpful in staging the patient
- Familiarization of the indications and contraindications of surgery, the role of surgery in the staging, cure, palliation and organ preservation
- Understanding of radiation biology, radiation therapy as a curative and palliative modality, treatment planning and dosimetry and the acute and late effects of radiation therapy
- Usefulness of anticancer agents in primary and recurrent malignant disorders in the neo-adjuvant, concomitant, and adjuvant setting
- Familiarization with the activities and indications for biologic therapy, including cytokines and hematopoietic growth factors
- Knowledge of etiologies of nausea and vomiting and pharmacology of anti-emetic agents
- Principles of diagnosis and management of infections and neutropenic fever
- Indications and complications of red blood cell transfusions

- Indications and complications of platelet transfusions
- Organ protection
- Mucositis
- Malignant effusions
- Extravasation
- Oncologic emergencies
- Paraneoplastic syndromes
- Nutritional support
- Palliative care and end-of-life care
- Pain
- Rehabilitation

Management and Treatment of Individual Cancers

Acquisition of competency in the epidemiology, pathophysiology, genetics, signs and symptoms, diagnostic work-up, treatment, and follow-up of the following individual cancers.

- Head and neck cancers
- Lung cancer and mesothelioma
- Small-cell lung cancer
- Non-small-cell lung cancer
- Mesothelioma
- Gastrointestinal cancers
- Esophageal cancer
- Gastric cancer
- Colon cancer
- Anal cancer
- Hepatobiliary cancers
- Pancreatic cancer
- Genitourinary cancers
- Renal cell cancer
- Urothelial cancers
- Penile cancer
- Prostate cancer
- Germ cell tumors
- Gynecologic malignancies
- Ovarian cancer
- Uterine cancer
- Cervical cancer
- Vulvar and vaginal cancers
- Breast cancer
- Sarcomas
- Bone sarcomas
- Soft tissue sarcomas
- Skin cancers

- Melanoma
- Basal cell and squamous cell cancers
- Endocrine cancers
- Central nervous system malignancies
- Carcinoma of unknown primary site
- Hematologic malignancies
- Leukemia
- Acute leukemias and myelodysplasia
- Chronic leukemias
- Lymphomas
- Hodgkin's disease
- Non-Hodgkin's lymphoma
- Cutaneous T-cell lymphoma
- Plasma cell dyscrasias
- AIDS-associated malignancies

Other Aspects

- Psychosocial aspects of cancer

PHYSICS CURRICULUM (54 Hrs.)

Atomic and nuclear structure [including decay and radioactivity], production of X-rays, photons, and electrons, radiation interactions, treatment machines and generators; simulators (including computed tomography), radiation beam quality and dose, radiation measurement and calibration, photons and X-rays (including concepts, isodoses, monitor unit, heterogeneities, field shaping, compensation, field matching, etc.), electrons (including concepts, isodoses, monitor unit, heterogeneities, field shaping, field matching, etc.), external beam quality assurance, radiation protection and shielding, imaging for radiation oncology, 3D-CRT including ICRU concepts and beam-related biology.

Assessment of patient setup and treatment (including electronic portal imaging device, immobilization, etc.), IMRT, special procedures (including radiosurgery, TBI, etc.), Brachytherapy including intracavitary, interstitial, HDR, etc., hyperthermia, particle therapy.

SPECIALIST TRAINING

The framework for specialist training will consist of rotations, which should give appropriate experience in the areas identified below.

Generic Modules:

- Prescription and administration of cytotoxic chemotherapy
- Professional attitudes
- Communication skills

System-Based Site Specialties:

- Breast
- Thoracic malignancy
- Upper and lower gastrointestinal (GI)
- Head and neck
- Sarcomas
- Gynecological oncology
- Urological malignancy and germ cell tumors
- Neuro-oncology
- Skin
- Lymphomas
- Paediatric oncology

Technique-based specialties:

Brachytherapy

In many training schemes trainees will receive specialist training in more than one site specialty at the same time. The order of rotations and their duration will be decided on case to case basis.

Training schemes must ensure that their trainees are able to achieve all or almost all of the specialist training objectives for each site specialty.

On-call. When competence for such work has been established, each trainee will participate in an appropriate on-call rota, or other schemes of exposure to acute and emergency oncology, in which he/she will be responsible to a named consultant(s).

Clinical skills

The Clinical Skills Section of the curriculum delineates the training objectives (knowledge and skills) that will be acquired at expert and advanced levels.

Each component of the training programme will have a clearly defined structure for the supervision of the trainee by senior colleagues (trainers). There will be a named consultant(s) who will assume overall responsibility for the training given during that period.

The trainer will also be responsible for undertaking appraisal of the trainee at the beginning, during and at the end of the rotation and may be involved in the end of rotation assessment.

Teaching Faculty

Department	Faculty
Radiation Oncology	Dr. Jawaid A. Mallick - Associate Professor & Head Cancer Hospital
	Dr. Abn-e-Hasan - Consultant Radiation Oncologist
	Dr. Qurat ul Ain - Consultant Radiation Oncology
	Dr. Ayesha Javed - Senior Registrar Oncology
Medical Oncology	Prof. Tariq Siddiqui - Director Oncology
Medical Physics	Mr. Aziz Ahmad Siddiqui - Chief Medical Physicist
	Mr. Asghar Hussain - Principal Medical Physicist
	Mr. Arshad Mahmood - Senior Medical Physicist
	Mr. Rahim Gohar - Senior Medical Physicist
Histopathology	Dr. Saba Jamal - Consultant Hematologist & Pathologist
	Dr. Fauzia Lateef - Sr. Consultant Pathologist
	Dr. Adnan Mustafa Zuberi - Consultant Clinical Pathology
Medicine	Prof. Ejaz A. Vohra - Chairman Department of Medicine & Dean Postgraduate Education (Clinical)
	Dr. Javed Warind Abu Baker - Department of Medicine
	Dr. Imtiaz Khalil - Assistant Professor, Department of Medicine
Radiology	Dr. Kashif Shazlee - HOD Radiology & Consultant
	Dr. Irfan Ahmed Lutfi - Associate Professor Radiology
	Dr. Muhammad Saad Ahmed - Senior Registrar Radiology
Surgery	Professor Shafiq Ur-Rehman - Chairman Department of Surgery
	Professor Abbas Zafar - Chairman Department of Otolaryngology, Consultant (ENT)
GI Medicine	Dr. Nasir Laeeq - Assistant Professor Gastroenterology
	Dr. Qamar-UI-Arfin - Consultant Gastroenterologist
Paediatrics	Dr. Shamvil Ashraf - Medical Director Indus CCH