

MEDICAL PHYSICS EDUCATION AND TRAINING IN ALGERIA

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Abstract— In Algeria, it is in the field of radiotherapy that medical physics has begun to play an important role with the first radiotherapy center which began its activity in 1959 and then extended to radiodiagnostics and applications of radioisotopes in nuclear medicine. Training in medical physics began in 1983 and then went through several stages and accompany the development of medical activities using ionizing radiation.

Keywords— Algria, medical physics, clinical training.

I. INTRODUCTION

In Algeria, cancer has become a public health problem with the launch of the National Cancer Plan. According to assessments made by the National Cancer Committee and the National Institute of Public Health (INSP), there are currently approximately forty thousand to fifty thousand (40,000-50000) new cases of cancer per year. The distribution of the incidence of cancer cases between the sexes is fairly equal, with 48.6% of cases occurring in men and 51.4% of cases in women. In addition, during the last two decades, there has been a rapid increase in the number of radiological equipment used in medical imaging and in the treatment of cancers, as well as the introduction of new equipment and new techniques using ionizing radiation. With the technological developments of radiation treatment and imaging equipment, the need for medical physics has increased in recent years. This has helped to make the medical physics intervention in the diagnosis and treatment processes necessary and mandatory to achieve the required objectives and to ensure the protection of patients, staff and the public as well as to maintain the level of performance of equipment used. In Algeria, it is in the field of radiotherapy that medical physics have begun to play an important role, extending to radiodiagnostics and applications of radioisotopes in nuclear medicine.

II. INFRASTRUCTURE

The management of cancers in Algeria began in the 1940s and the first radiotherapy center, Centre Pierre et Marie Curie (CPMC), was inaugurated in 1959 in Algiers. After independence, the number of radiotherapy and medical imaging infrastructures has steadily increased and in the last decade and especially after the launch of the cancer plan, the number of infrastructures using radiological

equipment for treatment and for the diagnosis has seen a phenomenal leap.

Algeria has twenty-two (22) cancer treatment facilities in University Hospital Centers, Specialized Hospital Establishments or Private Hospitals throughout the national territory (16 in the public sector and 6 in the private sector).

The specialty of nuclear medicine is exercised in the public hospital sector (10 departments and 02 units) and in the private sector (Several private facilities currently provide scintigraphic examinations).

In addition, Algeria has a large number of medical imaging equipment throughout the national territory in both the public and private sectors (15 University hospitals, 481 Regional hospitals, 75 Specialized Hospitals, 1659 Polyclinics, 299 private offices of radiology, 01 private hospital).

Table 1 Medical equipments for medical imaging and radiation therapy

Equipment	Total
SPECT/CT	11
SPECT	24
PET/CT	1
Dose calibrators	≈50
Co-60 EBRT	3
Accelerator	55
MRI	150
CT	574
Mammography	281
Standard Radiology	3000
Interventional	50

III. REGULATION OF MEDICAL PHYSICS

In view of the Algerian regulations on radiation protection, the presence of medical physicists (radiation physicists) is mandatory in the radiotherapy departments (see Decree 05-117 of 11 April 2005 on protective measures against ionizing radiation) [3]. Algerian regulations also require the presence of a medical physicist in nuclear medicine units. In particular, in each radiotherapy department, the presence of at least one qualified medical physicist, who is competent in the subject concerned, is required on a full-time basis. For routine practices in therapeutic nuclear medicine and for diagnostic nuclear medicine practices, a medical physicist, who is competent in the subject area, should be available. For other radiological

practices, a qualified medical physicist, who is competent in the subject concerned, must be involved, in particular, for optimization purposes, including for patient dosimetry and quality assurance (cf. 68, 69 & 70 Decree 05-117).

Table 2 Distribution of medical physicists in Algeria

Medical Physicists	Total
Radiotherapy	112
Nuclear Medicine	13
Radiology	4
Total	129

IV. EDUCATION AND TRAINING

In Algeria, the training and practice of medical physics began in 1983 as part of the Magister in radiation protection. In 1988, a DPGS (Diploma) training in Medical Physics was launched by the Haut Commissariat à la Recherche (HCR), followed in 1990 by a Magister program in Medical Physics. This training stopped during the nineties following the saturation of the national needs. Training in medical physics resumed in 2004 following the expression of the needs of the Ministry of Health, Population and Hospital Reform (MSPRH) with the launch of new Anti-Cancer Center as part of the cancer plan. This training, of the postgraduate level Magister, was provided by the Faculty of Physics of the University of Science and Technology Houari Boumediene (USTHB) in collaboration with the Center of Nuclear Research of Algiers (CRNA) of the Commissariat for Atomic Energy (COMENA) and hospital departments (Radiotherapy, Medical Imaging and Nuclear Medicine) of the MSPRH. The Magister program includes one year of academic training in medical physics and a period of 12 to 18 months of clinical training and dissertation preparation [1]. At the same time, a technical cooperation project was launched with the International Atomic Energy Agency (IAEA) on Strengthening National Training Capacities in Medical Physics (ALG6014). Project in which, the program benefited from the contribution of international expertise in the field of training in medical physics. The major remark of the audit report highlighted the need to strengthen clinical training and make it an independent part of academic education program and well formalized [2].

In 2007 the university education system in Algeria moved to the LMD system and several Algerian universities launched Master's degree programs in medical physics. In 2009, as part of the ALG6014 project, an expertise was requested for the evaluation of the training program of the Master of Medical Physics taught by the USTHB in collaboration with COMENA and the MSPRH. The report of the expert mission highlighted in a major way [4]:

- The harmonization of the academic training programs of the Masters of Medical Physics.

- The need for the introduction of a clinical training which must be independent and complementary to the academic program with a well-defined and harmonized program.
- The establishment of an accreditation and registering mechanism for the exercise of the profession of medical physicist.

Currently, seven (07) universities offer a Master's degree program in Medical Physics.

V. CONCLUSION

Medical Physics is a growing discipline in Algeria with the launch of a new cancer treatment center and the introduction of new diagnostic and treatment techniques. This has led to an increase in the number of qualified medical physicists operating at the level of hospital structures using radiation as well as the strengthening of training capacities in the field of medical physics.

However, in order to strengthen the framework for education and training in medical physics and to be in conformity with the international standards in the matter, it is necessary to proceed to

- Reorganization of medical physics education and training programs and introduction of a regulated and harmonized clinical training program
- Standardization and harmonization of academic education programs in Medical Physics.
- Strengthening of national regulations in this area.
- The introduction of a continuous professional development scheme for the discipline

Several documents and proposals have been produced by different groups of national experts to respond to these recommendations. These documents even included proposals for regulatory texts relating to the organization and regulation of clinical training.

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