

EDUCATION TRAINING CERTIFICATION AND PROFESSIONAL DEVELOPMENT OF MEDICAL PHYSICISTS IN INDIA

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Abstract—

This paper describes about the medical physics education in India. The mandatory requirement for the Medical Physics course conducting institution and the entry level qualifications required by the candidate as per the requirement of Atomic Energy Regulatory Board (AERB), is also mentioned in detail. The need for medical physics internship program, after the completion of the academic course, is also discussed. The paper also includes the requirement of professional registration and recognition, professional body i.e. Association of Medical Physicists of India (AMPI) and certification program conducted by College of Medical Physics (CMPI), a scientific wing of AMPI.

Keywords— Medical Physics, Certification, Education and Training, Professional development, Internship

I. INTRODUCTION

Medical Physics is a new and important discipline of science which deals with the application of physical principles and methods to the diagnosis and treatment of diseases. About three decades ago, medical physics activities were restricted primarily to the dosimetry of ionizing radiation. In the recent past, this concept has changed considerably and now the medical physicists are involved in all the aspects of medical application of radiation including radiation safety and play vital roles both in diagnosis and therapy of diseases. Foreseeing the requirements of medical physicists and radiation safety officers (RSOs) well in advance, the Radiological Physics & Advisory Division (erstwhile Division of Radiological Protection), Bhabha Atomic Research Centre (BARC) started a regular training programme in Radiological Physics in 1962, in collaboration with the World Health Organization. This course was later converted as Diploma in Radiological Physics (DipRP). The DipRP course of BARC is a prestigious multidisciplinary education and training programme which is well recognised both in India and abroad. Currently, this course is conducted under the aegis of Homi Bhabha National Institute (a deemed to be university) as one year Post MSc program in Radiological Physics. The DipRP program has produced a number of

world renowned medical physicists who is serving the society all over the globe.

II. INCREASE IN EDUCATIONAL INSTITUTIONS

Considering the increased demand of medical physicists/RSOs in the country, a few universities/institutions also started education and training programme in medical physics. The Anna University, Chennai was the first institution to start 2 years MSc (Medical Physics) Degree course in 1982. Currently, 22 universities/institutions are conducting courses in medical physics in India. As far as course modality is concerned, two different types of medical physics courses are conducted in India, namely (i) Post MSc Diploma in Radiological/Medical Physics (DipRP/DipMP), and (ii) MSc Degree in Medical Physics [MSc (Medical Physics)]. In DipRP/DipMP course, the entry level qualification of the candidate is MSc Degree in Physics whereas in MSc (Medical Physics) course the entry level qualification is Bachelor of Science Degree majoring in physics. As most of the medical physicists trained in India work in the discipline of radiation oncology medical physics (ROMP), the entry level qualifications are based on the eligibility criteria prescribed by the Atomic Energy Regulatory Board (AERB) for medical physicist and RSO. The curriculum of the DipRP course, conducted by BARC, has been adopted by the AERB indicating it to be one of the best courses in the country with its well-organized modality.

III. INTERNSHIP AND PROGRAM HARMONISATION

A qualified medical physicist is a professional with education and specialist training who is competent to practice unsupervised in one or more subfields of medical physics. An ROMP is involved in many clinical activities including performance evaluation of imaging and therapy equipment, physical and patient dosimetry, treatment planning, research and development, and teaching related to medical use of ionizing radiation and associated radiation protection and safety [1]. Advanced technology therapy and imaging equipments are now-a-days commonly used for treating the cancer patients by highly advanced clinical techniques such as intensity modulated radiotherapy, image guided radiotherapy, stereotactic radiosurgery/radiotherapy,

and volumetric modulation arc therapy. Providing physics support in these high precision and highly conformal clinical techniques are also the routine responsibilities of the medical physicists. It will be challenging for a medical physicist without supervised clinical experience to provide physics support in such cases. Due to the complexity of recent radiotherapy equipment and clinical techniques and to ensure the effective and safe treatment for the patient, medical physics internship at a well-equipped radiotherapy centre for at least one year duration on successful completion of academic component has been incorporated in the medical physics education in India. A structured competency based medical physics internship programme was developed and implemented from July 2013. As on today, more than 100 radiotherapy centres are conducting medical physics internship in India.

IV. PROGRAM RECOGNITION AND PROFESSIONAL REGISTRATION

It is a mandatory requirement for an educational institution/university to obtain the recognition of their medical physics education and training program by the Atomic Energy Regulatory Board (AERB), Mumbai. AERB has prescribed minimum requirements for conducting education and training program in medical physics which includes the course syllabus, entry level qualification of candidates, and course conducting infrastructure [2]. Minimum requirements has also been prescribed for the institutions interested of conducting medical physics internship. Successful candidates of AERB recognised education and training institutions/universities who have successfully completed their medical physics internship from AERB recognised internship institutions can apply for obtaining professional registration from AERB as medical physicist through the on-line registration system eLORA (e licensing for radiation applications). It is important to mention that certificate of successful completion of academic component is given by the concerned institution/university and the successful completion of internship certificate is issued by the concerned internship centre. AERB eLORA registered medical physicists are also allowed to appear for medical safety certification examination conducted by Radiological Physics and Advisory Division of Bhabha Atomic Research Centre, Mumbai.

V. CERTIFICATION BY PROFESSIONAL SOCIETY

The College of Medical Physics of India (CMPI, a scientific wing of Association of Medical Physicists of India) started competency certification of Radiation

Oncology Medical Physicists in 2009 [3]. However, this certification is voluntary in nature and it is expected that this certification may become a mandatory requirement in future. Many qualified medical physicists have appeared in this certification examination in last ten years and received CMPI certification. The eligibility for appearing in CMPI certification examination and test pattern are available at CMPI website (www.cmpi.org.in).

VI. PROFESSIONAL SOCIETY AND PROFESSIONAL DEVELOPMENT OF MEDICAL PHYSICISTS

The Association of Medical Physicists of India (AMPI) The Association of Medical Physicists of India (AMPI) was founded in 1976 with the main objective to promote the application of physics in medicine. The AMPI is a non-profit, non-trade, an all India organization primarily engaged in educational and research activities in the field of applications of Physics in Medical Sciences. In fact, it is a registered public trust which is governed by the constitution of the association (Executive Committee and the Board of Trustees). The AMPI was started with less than 100 members on record in 1976. Immediately after its formation, the association started publishing a quarterly bulletin popularly known as "AMPI Medical Physics Bulletin". This periodical was containing a few articles of practical importance along with other scientific and technical information including regulatory and administrative requirements for medical uses of ionizing radiation. The association also started conducting annual conferences from the year of its inception where national and international experts used to share their knowledge and information for the benefit of the society.

VII. SUMMARY AND CONCLUSIONS

In summary, medical physics education in India is well-structured. However, there is always scope of improving the quality of teaching and training which is being initiated by incorporating training for trainers. Now, it is required to initiate the process of revalidation of certification both for clinical competency and radiological safety.

REFERENCES

1. AERB Safety Code on Radiation therapy sources, Equipments & installation (Code No. AERB/RF-MED/SC-1)
2. Standing Committee on training courses & radiation professionals
3. CMPI Revised Scheme 2019 (www.cmpi.org.in)