REVIEW ARTICLE

A review of the IAEA approach toward the "code of ethics in medical physics practices"

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ABSTRACT

Medical physics has become an essential part of the applications of radiation in areas like radiology, nuclear medicine, and radiotherapy. Apart from the technical skills, medical physicists should also be well versed in the ethical guidelines developed by medical physics professional bodies. In Pakistan, no such guidelines have been established by the medical physics community. Therefore, it is vital to understand the code of ethics developed by the medical physics bodies in other countries. Several professional bodies like the American Association of Physicists in Medicine and others have developed a code of ethics for medical physics practices, and the medical physics communities throughout the world use this code of conduct extensively. Likewise, the International Atomic Energy Agency has, through its publication "Roles and Responsibilities, and Education and Training Requirements for Clinically Qualified Medical Physicists, Human Health Series 25, 2013," elaborated a code of ethics for member states. The same approach may also apply to the medical physics community in Pakistan. This article reviews the international practices and the significance of the code and its application in Pakistan.

Keywords: Medical physics, IAEA publications, code of ethics in medical physics, AAPM.

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Introduction

The medical profession is not limited to diagnosing or treating diseases nowadays [1]. It has become a multidisciplinary field with many specializations like medicine, paramedicine, engineering, data management, pharmacy, chemistry, etc. In particular, the field of radiation medicine involves physicists with high significance. Generally, physicians are well-versed in the ethical aspects of medicines, how to deal with patients and their attendants, and how to handle the data and privacy related to patients. The physicists are not always well-versed in medical ethics, but they still have obligations to meet the standards of professional ethics in the medical field. Before discussing the ethical aspects of medical physics practices, a brief overview of "ethics" and "medical physics" is given below.

A "Medical Physicist" is a professional who applies the laws of physics in medicine [1]. According to the International Labor Organization and the International Atomic Energy Agency (IAEA) definition and classification, medical physicists can also be classified as health professionals due to their involvement in patient care [2,3].

According to the Cambridge dictionary, ethics means "the study of what is morally right and wrong or a set of beliefs about what is morally right and wrong." The American Medical Association has established nine principles for ethics in medicine. All these principles are addressed to physicians but are also generic and can be applied to other fields. These principles talk about competence, patient privacy, honesty, etc. [4].

Similarly, the premier professional body of medical physicists in the United States, i.e., the American Association of Physicists in Medicine (AAPM), has developed a code of ethics for medical physicists [5]. The IAEA publications have grossly referred to the same code of ethics [6].

In Pakistan, it is mandatory to have a medical physicist for every nuclear medicine or nuclear cardiology facility. The medical physicist in a nuclear medicine facility usually performs radiation protection and other technical activities like QC of the equipment. Most of the time, medical physicists have no background in ethical considerations because this topic is not a part of the medical physics educational program. Therefore, they have to learn this topic after joining a medical facility. Therefore, the prior and refresher learning of medical physicists in

nuclear medicine regarding the ethical code of practices should be developed and exercised.

Existing Situation in Pakistan

In Pakistan, only one university, i.e., the Pakistan Institute of Engineering and Applied Sciences, offers a formal master's degree program in medical physics. However, the program focuses on technical aspects like radiotherapy, nuclear medicine, radiology, radiation detection and protection, mathematics, image processing, etc. No other university in Pakistan offers any formal medical physics program, so the ethical aspects of medical physics have primarily been unaddressed.

In Pakistan, physicians are well versed, through their curriculum, in learning and applying ethical principles. The Pakistan Medical and Dental Council has ensured that medical curricula should address this issue throughout the country [7]. However, practicing these principles and retaining their knowledge and awareness is not always evident [8].

As mentioned earlier, the AAPM has developed the code of ethics of medical physics practices, and the IAEA has referred to this code in its publication on human health [6]. This publication includes, among other topics, an annexure that details the elements of the code of ethics for medical physics practices. Since Pakistan is one of the IAEA member states, the code of ethics may be adopted by the medical physics community in Pakistan.

The IAEA Code of Ethics for Medical Physicists

The code of ethics starts with a description of its importance and background, based on the publications and information from the AAPM and the Health Care and Professions Council. It also says that in some countries, post-graduate students working in clinical research or residency programs must be aware of this concept.

The code has two main sections: (i) principles of professional conduct and (ii) guidelines of ethics.

Principles of professional conduct

This section presents 13 mandatory principles to be complied with by a medical physicist. There is no sub-section in this section. The topics covered in these 13 principles are quality of patient care, patient privacy, rights of patients and co-workers, recognition of the limitation of own knowledge and making an effort to improve competence, awareness, and compliance with the regulations and rules, professionalism, honesty and mutual respect, and reporting of incidents as required by the rules.

Guidelines of ethics

This section is composed of three sub-sections: (i) guidelines for professional conduct, (ii) guidelines for research ethics, and (iii) guidelines for education ethics.

The first sub-section addresses 15 points about professional conduct. This sub-section includes academic freedom, honesty, competence, professionalism, responsibility, confidentiality, conflict of interest, discrimination, harassment, relationship with co-workers, awareness of regulations and rules, and reporting.

The second sub-section addresses the obligations for biomedical research and maintaining substantial standards of the research. This sub-section topics include management and ownership of research data, conflict of interest, human participation, misconducts, animal welfare, collaborative sciences, authorship and editorship, confidentially, and overlapping publications.

The third sub-section describes a teacher or trainer's ethical standards and practices in the case of an educational or training program. The topics in this sub-section are further classified for teachers and students separately. For the teacher, the topics include student program completion, safe environment, respect for students, non-discrimination, confidentiality, harassment or consensual relationship, acknowledgment of work, freedom of learning, and fair evaluation. For students, the topics include maintaining personal records, the requirement of the education program, reporting, honesty and integrity, freedom of expression, patient privacy and confidentiality, respect for others, and respect for other works and property.

Conclusion and Recommendations

The AAPM and IAEA have outlined a detailed code of ethics for medical physics practices. The two organizations' development of the code of ethics is a serious effort. The medical physics profession has become a strong pillar of radiotherapy and nuclear medicine practices in Pakistan. There has been no reported or published training or education on this particular issue in Pakistan. It is recommended that the medical physics community in Pakistan adopt the IAEA code of ethics for medical physics and increase awareness among medical physicists working in hospitals or universities.

List of Abbreviations

AAPM	American association of physicists in medicine
IAEA	International atomic energy agency

Conflict of interest

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