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NUCLEAR MEDICINE INTERDISCIPLINARY INTEGRATION OF THE SCIENCE OF TECHNOLOGIES ON THE TOPIC OF THE EFFECTS OF IONIZING RADIATION ON LIVING ORGANISMS

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Abstract
This article provides detailed information about ionizing radiation, its types, current use in medicine, its harmful effects on the human body, and reveals the features of using interdisciplinary integration in its teaching.

Keywords: Medicine, ionizing radiation, diagnostics, treatment, educational practice, scope, radiation, radiation dose.

Introduction

Today, modern education is faced with the task of preparing young people for a full life in various socio-cultural and spiritual spheres, but no single curriculum can cover all of them. Therefore, only an integrated approach to the educational process of higher education institutions can help to overcome this contradiction. In modern educational practice, the integration of disciplines is one of the directions of finding new pedagogical solutions, which is associated, first of all, with the unification of separate sections of different disciplines into a single whole in order to eliminate the uniformity of the goals and functions of teaching;

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secondly, with the creation of a holistic view of the future profession of students (integration here is the goal of teaching) and providing a common space for the convergence of subject knowledge (integration here means a means of education) [1,2].

Taking into account the further aspects of interdisciplinary integration in the formation of the competitiveness of its students, interdisciplinary integration of professional training of university students contributes not only to improving the quality of scientific, theoretical and practical training of future specialists, but also to the development and education of modern students. At the present stage of development of medicine, the use of ionizing radiation (IN) has become widespread, both in the field of diagnostics (diagnosis) and in the field of treatment of various spectrum pathologies and, if necessary, therapeutic procedures, dozens of diagnostic works are also carried out using IN [3,4].

Literature Analysis

Yu.M. Kolyagin said, "Any integrated lesson is not a unit of lessons in which different subjects automatically rotate. The lesson is a given whole, it needs a leading idea, which ensures the implementation of an inseparable connection" [5]. "Everything needs relationships, it is taught in the same way as communication," - emphasizes Ya.A. Komensky. The famous Russian pedagogue KD Ushinsky: "Separate knowledge leads to necrosis of thoughts and concepts," - says [6].

Research Methodology

It should be noted that an integrated lesson is a special type of lesson, combining education in which several subjects are simultaneously studied, concepts, topics or phenomena [7].

The main features of an integrated lesson:

- solid structure and accuracy;
- presentation of educational materials;

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– the logical system of interdependence and the relationship between the education of various disciplines;
– completeness of education and material information capacity;
– elements of research activities and analysis.

Thus, ionizing radiation is, in the narrow sense, radiation in the ultraviolet and visible light range, which does not include ionizing radiation, which can be ionizing in some cases.

Microwave and radio wave radiation is non-ionizing because its energy is not sufficient to ionize atoms and molecules in the ground state [8].

The maximum permissible radiation dose for the human body is 5 mSv/year (500 mREM). The use of ionizing radiation in medicine: diagnosis of diseases using activation analysis, labeled atoms and radiography, tumor treatment, sterilization of pharmaceuticals, clothing, medical devices and equipment. Radiation diagnostics is a whole range of diagnostic tools, which includes computed tomography, magnetic resonance imaging (MRI), X-ray, ultrasound [9].

Radiation therapy - in most cases refers to the use of ionizing radiation for the treatment of oncological diseases.

The process of treating oncological diseases with the help of radiation therapy The nature of ionizing radiation: the following types of ionizing radiation are the most important: 1. Short-wave electromagnetic radiation (a stream of high-energy photons): - X-rays; - gamma radiation. 2. Particle flux: - beta particles (electrons and positrons); - alpha particles (nuclei of a helium atom; -neutrons; - protons, other ions, muons, etc.); - fission fragments (heavy ions resulting from the fission of nuclei). Subjects of medical radiation External radiation of high intensity from 10-50 X-rays leads to an acute form of radiation sickness, which can occur in occupational accidents and in military conditions [10]. Analysis and results. The use of IN in medicine covers several categories of persons: employees, patients and the entire population.

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Table 1. The contribution of different imaging modalities in the formation of medical radiation

Source of Information	Application Area			Method Share, %
	Preventive Measures	Diagnostics	Therapy	
Ultrasound		US Diagnostics (UTT)		20
Magnetic Field		MRI		≤ 0.1
X-ray Radiation	Fluorography, Mammography	X-ray Diagnostics	X-ray Therapy	78.5
Radionuclides		Radionuclide Diagnostics, PET	Radionuclide Therapy	1.1
α, β, n, p - Radiations			α, β, n, p - Therapy	0.3

The main categories of individuals who require radiation protection in medicine are:

* Employees - from occupational radiation
* Population - from existing environmental IN sources in the place of residence
* Patients - from medical radiation

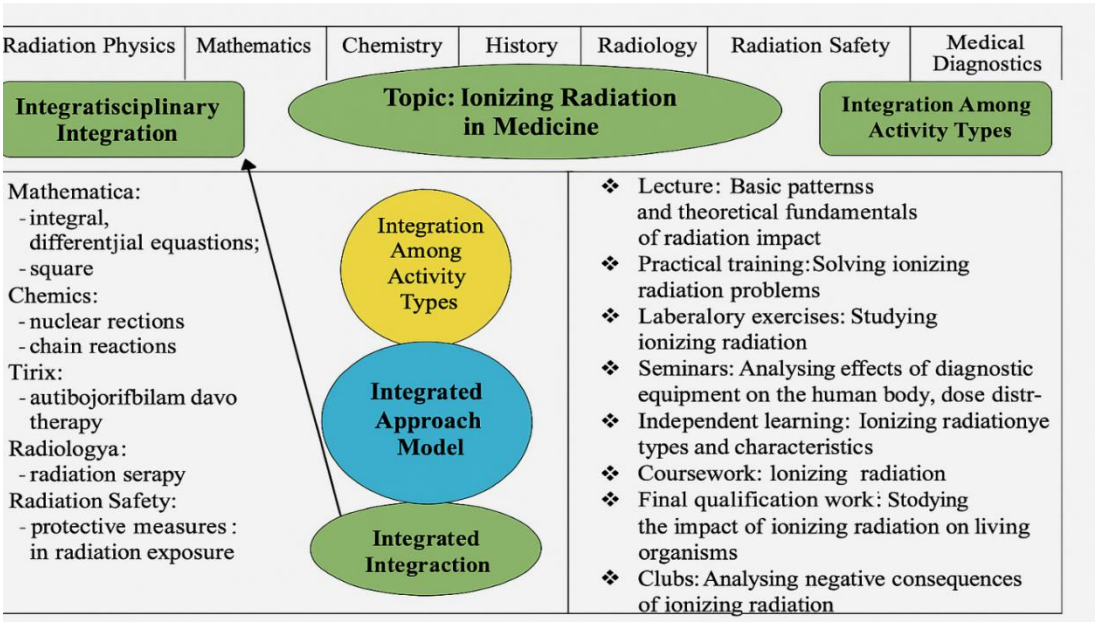

Figure 3. Model of an integrative approach to teaching the topic of ionizing radiation in medicine

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In general, when teaching the topic “Ionizing Radiation in Medicine”, it is advisable to study the topic based on the integrative approach model, including interdisciplinary integration and integration between types of training. Interdisciplinary integration reveals the interconnection of the topic with radiation physics, mathematics, chemistry, history, radiology, radiation safety, medical diagnostics and other disciplines in the blocks of the curriculum. Integration between types of training serves to ensure the connection between lectures, seminars, practical, laboratory classes and independent learning, as well as other types of training. In teaching the topic “Ionizing Radiation in Medicine”, the aspects of commonality and continuity between mathematics, chemistry, as well as the disciplines of direct specialization, radiology, radiation safety and medical diagnostics, as well as elements of the historical-biographical approach in covering the topic are presented in the table on the left (interdisciplinary integration). The table on the right shows the connection between the types of activities in teaching the subject, and the theoretical information and knowledge obtained in each subject are enriched in various activities, thereby creating an opportunity for the formation of a complete scientific worldview in students.

Conclusions and suggestions

Thus, the use of interdisciplinary integration in teaching the topic “Ionizing Radiation in Medicine” ensures the expansion and replenishment of students' existing knowledge, thereby stimulating their cognitive activity and development as subjects of the educational process. This topic was taught to students of the Tashkent State Pediatric Medical Institute's Department of "Biophysics, Medical Informatics" 60910200 - "Medical Work" 1st stage 101 DI, 105 DI, 125 DI, 60910300 - "Pediatrics" 1st stage 109 1P, 117 1P, 121 1P, 107 2P, 110 2P, 60910600 - "Medical Biological Work" 2nd stage 201 TB, 202 TB, 203 TB, 204 TB groups and 4th stage 401 TB, 402 TB, 403 TB, 404 TB students during the pilot period using various innovative and interactive methods, and positive results were achieved.

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