TEACHING THE TOPIC "THE EFFECT OF RADIATION ON THE BODY" BY USING THE "DISCUSSION" METHOD

Authors: Gulparshin Maxsudovna Nasirova, Doctoral candidate, Nukus State Pedagogical Institute named after Ajiniyaz

Dilafruz Abdukarimovna Kalandarova, Alfraganus University.

Erkin Xojiyevich Bozorov, Chief Scientist, Laboratory of Nuclear Medicine, Institute of Nuclear Physics, Academy of Sciences of Uzbekistan; Professor, Department of Nuclear Physics, Faculty of Physics, National University of Uzbekistan.

E-mail

Tel: 88-078-74-74

Abstract: This article presents the results of a scientific study on "The Effect of Radiation on the Body," using the "Discussion" method. Data, achievements, and shortcomings that help comprehensively illuminate the issue using modern methods were studied. Pedagogical analysis was conducted along with correct solutions to posed tasks and tests, and innovative ways to facilitate better comprehension by students were discussed. The "Discussion" method demonstrated an efficiency of 12% in the teaching process.

Keywords: Discussion method, radiation, equivalent dose, cataract, absorbed dose.

Introduction: The complexity and versatility of the professional activity of a modern teacher requires the development of various pedagogical research in the process of work. The era requires the effective use of advanced pedagogical technologies for the comprehensive development of students and ensuring their results. This process requires great skill and deep knowledge from the teacher. One of the interactive methods - the debating method - is of great practical importance in improving the independent thinking of modern youth.

"Discussion" method. This method is proposed to provide students with the opportunity to substantiate their own opinions, ideas, exchange ideas, and participate in the debate. In order for students to discuss the lesson, firstly, the teacher himself must have a certain level of understanding of the discussion, since this method mainly covers problematic topics. Secondly, the purpose of the discussion is explained to those who are entering the discussion, and he monitors that they do not deviate from the topic. In this case, the opinion expressed by each student is written on the board, and at the end of the discussion, the answers to all the questions posed are pedagogically analyzed and the correct conclusion is reached. It is necessary to involve all students in the discussion and listen to everyone on each task. After all, the discussion should be based on an active, interesting, heated debate and conversation. For this, the topic and the tasks related to it should be announced to the participants in advance in the form of questions and the participants should not be neglected in their thorough preparation. Students should be given the opportunity to freely express their knowledge and opinions on the topic. The teacher is required to monitor the correct course of the

discussion and immediately redirect it if it deviates from the topic. The essence and content of the method can be explained as follows:

The essence of the method is to seek solutions to the problems posed by students by looking at their own life experiences, and to create a clash of different perspectives, different thoughts, and views in order to find a solution. In this way, students exchange ideas and experiences, and examine their own and others' pedagogical views during the lesson. Components: - students think broadly about the topic being studied, analyze the essence of the topic, and participate fully in the discussion to the extent possible;

- they use their own life experiences;

- they argue for a solution;

- they compare different points of view.

The teacher's leadership is the main controller in the discussion.

The teacher should give students the opportunity to express their thoughts freely and listen to their own thoughts based on their level of thinking. Only then will the student feel that the opinions of his/her classmates are taken seriously and will behave more freely. The impact of pedagogical discussion of the topic increases even more when students provide examples from their own experiences.

In the process of independent thinking, it is very important to summarize different points when concluding a discussion of finding a solution to a problem. Because the conclusion helps the discussion participants understand that there is a specific structure and logic in the discussion process. The effectiveness of the discussion largely depends on how it is organized. According to the experience of advanced educators, working in groups is the most optimal way to involve students in active discussion and increase their enthusiasm. Working in groups requires certain skills from both the teacher and the students. Accordingly, it can be organized around a round table; in separate small groups; in the form of an equal discussion. Working in groups helps even the most timid and shy students who have difficulty speaking to “open up”.

Due to the motivational nature of the discussion method and the participation of as many students as possible in various situations, high efficiency is achieved in working in groups. It is advisable for a group to consist of 8-10 people for the lesson. It is important to note that independent work in groups and free thinking should not be limited to rude speech and criticism.

The success of the debate depends on using students' life experiences and free thinking as a basis, encouraging students' independence. The criterion for such encouragement should be based on modern pedagogical methods and principles - life experience - a sequence of all conclusions. Topic description: ‘‘Scientific study of the effect of radiation on the body using the “Discussion” method

When receiving large doses of radiation, a person develops radiation sickness. Depending on the amount of doses and the duration of exposure, three degrees of illness are observed:

- acute radiation sickness (ARS);

- moderate radiation sickness;

- chronic radiation sickness.

ARS is divided into four degrees. 100÷200 ber or mild 1÷2Zv . It should be noted that the ber is an outdated unit of measurement in the SGS system of equivalent doses of ionizing radiation. In the SI system, the sievert (Sv) unit of measurement is used for these purposes. 1 ber is equal to 0.01 Sv = 100 erg/g. In the initial period - at all levels of NCD, the primary state is characterized by attacks of nausea. Headache, vomiting, general malaise, a slight increase in body temperature, in most cases - anorexia (loss of appetite), redness of the mucous membranes, infectious complications may occur. The primary reaction occurs 15-20 minutes after radiation exposure. Its manifestations begin to gradually disappear after a few hours or a day.

A latent period, called a false sense of well-being, sets in and lasts up to 20 days. This depends on the radiation dose and the general condition of the body. This period is accompanied by a temporary cessation of erythrocyte cell division, the death of young and dividing cells, the acceleration of the maturation process and the life span of mature cells. As a result, the supply of oxygen to the body's cells stops. During this period, the following changes are observed in the body:

- hair loss;
- neurological symptoms;
- decreased spermatogenesis in the early stages
- decreased menstrual cycle.

Mild ONC can be treated. The recovery period is up to three months. Personal positive emotions play a big role in this. Moderate (200- 400ber or ÷ ÷ 2- 4Sv) occurs with short bouts of nausea (which pass 2-3 days after irradiation). The latent period of moderate ONC is 10-15 days (sometimes it may not exist). During the latent period, leukocytes released by the lymph nodes die and cannot eliminate the infection that has entered the body. Platelets stop clotting. Platelets do not clot the blood. All these processes, along with ionizing radiation, lead to damage to the bone marrow, lymph nodes, and spleen. Tumors develop and skin rashes appear. This damage to the body is called "bone marrow syndrome." Moderate-to-severe leukemia can cause death in 20% of those affected. Death occurs as a result of damage to the tissues of the blood-forming organs. Treatment of this disease is carried out by isolating patients from the external environment, administering antibiotics and blood transfusions. Older men, middle-aged men and women are more likely to suffer from moderate ONJ than young people. 80% of those suffering from moderate ONJ begin to lose their ability to work within 1 hour after receiving radiation and remain impaired for a long time after recovery. Cataracts and diseases of the hands and feet may develop. Full recovery takes 1-2 years. Symptoms of severe levels of NK (400- 600 ber yoki ÷ ÷ 4 - 6 Sv): weakness, drowsiness, loss of appetite, nausea, vomiting, prolonged diarrhea are observed. The latent period can last 1-5 days. After a few days, symptoms of dehydration, a sharp decrease in body weight, weight loss and complete weakness appear in the body. These conditions are the result of the destruction of the intestinal wall cells that absorb

nutrients from the food that enters the body. These conditions are the result of the destruction of the intestinal wall cells that absorb nutrients from the food that enters the body. Cells in the body are sterilized under the influence of radiation and lose their ability to divide. Bacteria pass from the intestines into the blood. Wounds and radiation burns that appear as a result of primary radiation exposure develop purulent infections. 100% of those affected lose their ability to work within 1 hour of receiving radiation. After two weeks, dehydration and stomach poisoning, as well as radiation burns, result in death in 70% of those injured. After a very severe dose of radiation (more than 600 ber or > 6 Sv), severe nausea and vomiting begin within minutes. Diarrhea occurs 4-6 times a day, and in the first 24 hours - loss of consciousness, skin flushing, severe headache. These symptoms are accompanied by loss of coordination, difficulty swallowing, and convulsions associated with vascular spasms, and death may occur after 3-7 days. The immediate cause of death is an increase in the amount of fluid in the brain as a result of the leakage of fluid from small blood vessels, which leads to an increase in intracranial pressure ("central nervous system collapse syndrome"). Recovery of the body after radiation is a complex process that does not occur evenly. The recovery of erythrocytes and lymphocytes in the blood begins after 7-9 months, and the recovery of leukocytes begins after 4 years. The duration of this process is influenced not only by radiation factors, but also by psychogenic, socio-domestic, professional and other factors, which are called "quality of life".

Research Methodology. Interactive methods used to further improve the free thinking of undergraduate and graduate students of medical higher education institutions show high positive effectiveness. It is very appropriate to use debatable methods to develop students' free thinking about their personal plans for acquiring knowledge. The purpose of this debatable method is to:

- achieve a correct assessment of students' activity in finding solutions to problematic issues;
- substantiate students' attitude to the fact that they can understand that solving problematic issues in any situation is based on certain methods and principles;
- determine the level of students' thinking about finding a solution to the problem quickly in emergency situations and conditions.

Table 1.

1 – question	What is the activity of radioactive isotopes?	Answer: The activity of radioactive isotopes is expressed as the number of nuclei decaying per unit time. $A=\lambda N=(0.693\cdot N)/T_{(1/2)}$, λ-decay constant, N-number of nuclei in the radionuclide
2 - question.	What is particle flux?	Answer: Particle flux refers to the number of particles passing through a given surface in a unit of time.

		$\boldsymbol{\Phi} = \frac{\Delta N}{\Delta t}$
3 - question.	What is an equivalent dose?	Answer: The equivalent dose is equal to the absorbed dose in a tissue or organ multiplied by the weight coefficient.
4 - question.	How is particle flux density determined?	Answer: The particle flux density is found by the following expression: $J = \Delta\Phi/\Delta t = \Delta N/(\Delta S \cdot \Delta t)$ (6.2) The particle flux density is the number of particles (ΔN) passing through the cross section of the sphere (ΔS) in unit time (Δt). The units of measurement can be particle/(cm2·sec); photon/(cm2·sec); neutron/(cm2·sec), etc.
5 - question.	What is the ingested dose?	Answer: Absorbed dose is the basic quantity of dosimetry (DAbsorbed dose). Absorbed dose is the quantity that is absorbed by a unit mass of matter, the energy of ionizing radiation. 〖D Absorbed dose〗_( )= dE/dm

Topic description: "Scientific study of the effect of radiation on the body using the "Debate" method

In recent years, the demand for a wide range of modern, fast, accurate and inexpensive technical methods for diagnosing and treating diseases has been increasing. It is known that the rapid development of medicine in the world is closely related to devices operating on the basis of radiation. The effects of radiation on humans can be divided into two groups: Somatic and genetic.

Somatic effects are radiation directly applied to the human body.

Genetic effects are the manifestation of radiation in human descendants. This can be explained as follows. The observation of the effects of radiation in the descendants of a person who has worked directly with radiation.

Table 1 shows the effects of radiation on humans and the diseases that may occur as a result of them.

Table 1 shows the effects of radiation on humans

Somatic effect	Genetic influence
Light disease	Genetic mutation
Light damage to specific organs.	Chromosome aberration
Leukoses.	
The appearance of cancers in various organs.	

In addition, we can divide the effects of radiation on humans into threshold and stochastic categories. The threshold effect is that the number of cells that have lost their function as a result of radiation reaches such a critical state that if the radiation exceeds the threshold value, the organism cannot restore its function. The number of damaged cells increases. This is a sign of the disease. Table 2 shows the effects of different radiation dose values on the human body.

Table 2 shows the effects of different radiation dose values on the human body

Radiation dose, Gy	Cause and effect.
$(0,7 \div 2)\ 10^{-3}$	The amount of dose from natural background radiation in 1 year.
0,02	1-year limit dose value for category A.
0,1	The degree of double probability of gene mutations
0,25	The amount of dose that can be taken at once in emergencies
1,0	The dose that causes radiation sickness
3 ÷ 5	If left untreated, a person with 50% radiation exposure will die within 1-2 months.
10 ÷ 50	He/she dies after 1-2 weeks.
100	He/she will die in a few hours.

When the radiation dose to a person exceeds the threshold value, various defects appear in the body. Under the influence of radiation in biological tissue, free OH and H radicals are formed. These radicals collide with each other and with molecules and disrupt the functioning of the cell. Radionuclides accumulated in the human body are not evenly distributed. Based on the above topics, the following conclusion can be drawn. It is necessary to calculate the value of any dose received from radiation. It is necessary to know the values of the daily, weekly, monthly, and annual doses. If the received dose exceeds the established norm, it must be compensated for at the expense of the next year. In short, radiation safety rules must be fully followed.

Analysis and results. The scientific novelty of the results of the scientific research obtained in these educational processes is that in order to increase the effectiveness of independent learning of students of the professional education system during the educational process, the Tashkent Pediatric Medical Institute, Faculty of “II-Pediatrics and Medical Biology”, Department of “Biophysics, Medical Informatics” 60910200 – “Medical Work” educational direction 2nd stage students of groups DI-210, DI-208, DI-203, DI-211r. We conducted empirical research to determine the results of the organized training session in order to form students' competencies in teaching the topic "The effect of radiation on the body" for students of groups PI-201P1, PI-211P2, PI-209P2, PI-205P2 of the 1st stage of the educational direction 60910300 - "Pediatrics", and for students of groups TB-201, TB-202, TB-203, TB-204, TT-401, TT-402, TT-404 of the 2nd stage of the educational direction 60910600 - "Medical Biology". The students participating in this study were randomly divided into two groups: the first experimental group (28 students) received modern e-learning resources and interactive methods, and the second control group (27 students) received e-learning resources and traditional teaching methods.

The first group consisted of 28 students, and they received the following grades.

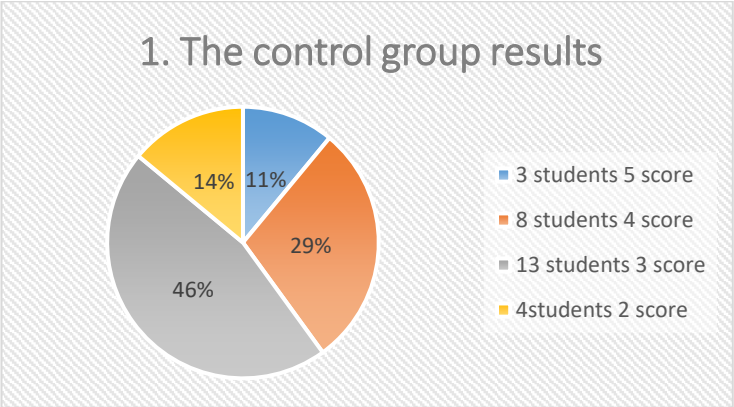
3 students 5 marks = 11% (average)

8 students 4 marks = 29% (average)

13 students 3 marks = 46% (average)

4 students 2 marks = 14% (average)

Acquisition rate = (11%+29%+46%+14%)/4=25%



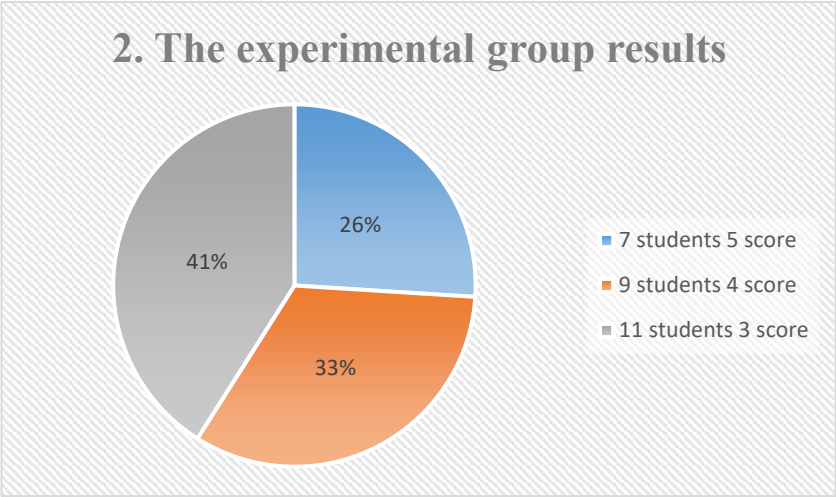
The results obtained for the second group of students using the interactive method "Discussion" method were as follows. There are a total of 27 students in this group and their results are as follows.

7 students 5 marks = 26% (average)

9 students 4 marks = 33% (average)

11 students 3 marks = 41% (average)

Acquisition rate = (26%+33%+41%)/3=33,3%



Conclusions and Recommendations. Conducting a lesson using the "Debate" method increases the enthusiasm of all students studying at medical universities for the lesson, provides students with the opportunity to substantiate their own opinions, points of view, ideas, exchange ideas, and participate in the debate, increases students' motivation, strengthens students' memory, teaches students to use their life experiences and free thoughts as a basis, develops a culture of debate, and forms the ability to conduct independent research and independent thinking to consolidate and analyze the knowledge acquired by students during the educational process. The

lesson conducted based on the “Discussion” Method yielded an 8.33% improvement in students’ mastery of the topic.

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