FEATURES OF TEACHING HYGIENE IN THE MEDICAL UNIVERSITY CONSIDERING SPECIALIZATION AND DIGITALIZATION

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The issue of organizing the teaching of hygiene considering specialization of the medical university faculties is relevant in the context of digitalization. Proficiency in digital skill determines the modern professional physician's competitiveness. The paper provides analysis of the use of digital technologies to study the relevant issues of hygiene. Educational process at the Department of General Hygiene of the Voronezh State Medical University is built on the principle of uniformity and consistency. Professional educational trajectory, including that on digital platforms, considers the teaching continuity, from fundamental theoretical subjects to clinical and specialized ones. Within the framework of educational process, issues of special hygiene, such as specifics of structure and use of medical institutions, features of professional activity of physicians of various specialties, are considered. Conventional methods to teach hygiene are supplemented with the differentially used innovative teaching techniques. The business game method is successfully used by the future clinicians to master the topic "Food Poisoning". The method of creating educational videos for visual demonstration of laboratory work can be used in distant learning. The digital learning method demonstrates the possibility of using advanced digital devices and internet-based technologies in preventive medicine. It seems necessary to further improve the educational process at all the faculties as educational and professional standards, as well as the academic passport for Hygiene, are updated.

Keywords: hygiene, specialization of faculties, innovative teaching technologies, digitalization

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ОСОБЕННОСТИ ПРЕПОДАВАНИЯ ГИГИЕНЫ В МЕДИЦИНСКОМ УНИВЕРСИТЕТЕ С УЧЕТОМ ПРОФИЛЬНОСТИ И ЦИФРОВИЗАЦИИ

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Проблема организации преподавания гигиены с учетом профильности факультетов медицинского университета актуальна в условиях цифровизации. Владение цифровыми навыками определяет конкурентоспособность современного врача-профессионала. В статье проведен анализ использования цифровых технологий для изучения профильных вопросов гигиены. Образовательный процесс на кафедре общей гигиены Воронежского государственного медицинского университета построен по принципу систематичности и последовательности. Профессионально-образовательная траектория, в том числе на цифровых платформах, учитывает преемственность преподавания от фундаментальных теоретических дисциплин к клиническим и профильным. В учебном процессе рассматривают проблемы частной гигиены, такие как специфика устройства и эксплуатации медицинских организаций, особенности профессиональной деятельности врачей различных специальностей. Традиционные методики преподавания гигиены дополнены дифференцированно используемыми инновационными методами обучения. Метод деловой игры успешно применяют для освоения темы «Пищевые отравления» будущие врачи-клиницисты. Метод создания учебных видеофильмов для наглядной демонстрации лабораторных работ может быть применен в случае дистанционного обучения. Метод цифрового обучения показывает возможности использования современных цифровых устройств и интернет-технологий в профилактической медицине. Представляется необходимым дальнейшее совершенствование образовательного процесса на всех факультетах по мере обновления образовательных и профессиональных стандартов, а также паспорта научной специальности «Гигиена».

Ключевые слова: гигиена, профильность факультетов, инновационные технологии обучения, цифровизация

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The main preventive discipline, hygiene, plays an important role in forming the worldview of modern physician. Teaching the academic discipline "Hygiene" at the Department of General Hygiene of the Voronezh State Medical University (VSMU) is organized in accordance with the faculty specialization and digital technology. The use of digital environment when studying hygiene is associated not only with the demands of society, but also with the young generation's need for information acquisition and exchange, self-organization and self-development. Information technology in the field of public health and preventive medicine opens up new opportunities for future specialists, minimizes the risk of making mistakes when working. Implementation of advanced developments into educational process via special programs and services makes it possible to improve the students' creative and research abilities, enhance motivation to study.

The study was aimed to characterize the features of organizing the teaching of hygiene at the Department of General Hygiene of VSMU taking into account specialization of the medical university faculties in the context of digitalization.

Theoretical (analysis, comparison, and compilation of data reported in scientific, methodological, and educational literature) and empirical (monitoring certain aspects of teaching and educational technologies used for students at various

medical university faculties during lectures and practical classes on hygiene, as well as during extracurricular activity) methods were used during the study.

Educational process for the academic discipline "Hygiene" is built in accordance with the competencies set out in the Federal State Educational Standards of Higher Education (FSES HE) 3++ and employment functions of Professional Standards for specialties. Improvement of employment functions is inseparably linked with digitalization. Further update of educational standards and the specified universal, general professional and digital competencies, as well as orientation on professional standards for specialties, will make it possible to improve methodological approaches to teaching [1–4].

Digital educational technologies at the Department of General Hygiene of VSMU

The main digital resources used in distance learning at the Department are the Webinar video communication service (Alex Alpern; Russia) and the Moodle digital environment (Martin Dougiamas; Australia). Teaching using the Webinar and Moodle digital platforms constitutes up to 30% of the subject complexity. The Moodle platform enables automatization of a significant number of classes on the subject at various faculties and creation of a common information space for students and teachers combining conventional forms of training and the use of information and computer technologies [5–10].

In Moodle, a training course being a combination of training modules and comprising lectures, practical classes, interactive control elements (tests, situational tasks, forums), interactive links to information resources was developed for each faculty. The benefits of such system are as follows: possibility to study the material in own pace, identification of weaknesses and gaps requiring special attention. Teachers can continuously monitor the process of mastering the educational materials and, therefore, more effectively manage the teaching process.

On the other hand, teaching the academic discipline "Hygiene" using digital technologies at various faculties has some features. Thus, the use of the digital element "Seminar" when studying the module "Hygiene of Medical Institutions" involves different scenarios. The features of engineering dental specialty institutions are studied at the Faculty of Dentistry, pharmacy projects are considered at the Faculty of Pharmacy, while medical institutions for the specialty are studied at the faculties of general medicine and pediatrics. Students are offered to create their own projects, discuss them on the platform, and choose the best one. The system continuously monitors user activity and prepares reports on their participation.

Organizing educational process at the department considering specialization of the medical university faculties

Teaching hygiene is oriented on training of primary care physicians, preventive medicine physicians, and pharmacists. According to FSES HE 3++ and the curriculum, 252 h or seven credit units are allocated per subject at the faculties of general medicine and pediatrics.

Faculties of general medicine and pediatrics

The lecture course on hygiene at the Faculty of General Medicine (12 lectures) includes issues related to hygiene of ambient air, water, water supply, nutrition, labor, children and adolescents, as well as hospital hygiene. The fuller lecture course at the Faculty of Pediatrics consisting of 14 lectures makes it possible to further elaborate the questions concerning hygiene of children and adolescents, in particular, health indicators of children and adolescents, health groups, methods to assess and estimate physical development, hygienic principles of organizing academic work at school. In all lecture courses attention is paid to the regional specifics of the ambient air quality, as well as climate-related factors, natural waters used to ensure water supply of Voronezh and the region. The content of the courses includes using the data from digital platforms of Rospotrebnadzor and practical healthcare structures.

Faculty of Dentistry

Students at the Faculty of Dentistry are taught hygiene for 108 h or three credit units. The curriculum provides for five lectures. Ten lecture hours at the Faculty of Dentistry, in contrast to 24 and 28 h at the faculties of general medicine and pediatrics, do not make it possible to fully describe the hygienic significance of environmental factors. Digital educational materials, in particular, original educational videos provided on the Moodle platform, allow students to fill the gaps. One of the lectures on the subject is dedicated to hygiene of dental specialty institutions and professional hygiene of dentists. Monitoring of the hygienic regulatory documentation is accomplished by using online resources and digital library systems. Digital content makes it possible to consider hygienic requirements for engineering, instrumentation and equipment of dental clinics in the up-to-date format, enables assessment of occupational hazards and diseases typical for modern dentistry. Furthermore, hygienic characteristics of water as the most important environmental factor in terms of its chemical composition are provided during lectures for dental students. It is reported that water can be the cause of endemic fluorosis and caries. Emphasis is placed on the quality of water in the Voronezh region, since water contains elevated levels of hardness salts, as well as iron and manganese, which requires the use of specific methods of water treatment and dispatching.

Faculty of Preventive Medicine

The academic discipline is most complex in the 2nd and 3rd year students of the Faculty of Preventive Medicine: 324 h or nine credit units. The lecture course consists of 12 lectures. The quantitative format of the lecture course at the Faculty of Preventive Medicine is similar to that for students of the Faculty of General Medicine, which, in our opinion, is insufficient. The basics of discipline, propedeutics of hygiene, without which high-quality training of the hygienic physician or epidemiologist is impossible, are taught at the Department of General Hygiene. A preventive medicine physician should be able to identify causal relationships between the changes in sanitary and epidemiological situation and health indicators of the population. Students at the Faculty of Preventive Medicine become familiar with the hygienic assessment methods, characteristics of various environmental factors and fundamentals of social and hygienic monitoring during classes and lectures on hygiene. Teaching the special academic discipline "Social and Hygienic Monitoring and Health Risk Assessment" in the fifth year allows them to master information and internet resources of the social and hygienic monitoring system. Students are taught to find and analyze information, including legislation and regulatory documents, in accordance with the professional task. The students are provided access to electronic databases of the

Rospotrebnadzor institutions, they work with the professional document search engine.

Given the faculty specifics, special attention is paid to preventive medicine methodology and hygienic standardization of chemical and physical factors. The common patterns of hazardous substances behavior in the biosphere, as well as combined and complex effects of chemical and physical factors on the body, are considered within the framework of environmental quality management. As for hygienic diagnosis of public health and environment, information is provided on toxicology of polymeric materials and sanitary hygienic expertise of products made of such materials. Part of the lecture course is devoted to teaching the scientific principles of healthy lifestyle, fundamentals of mental hygiene, hygienic aspects of physical activity and tempering, hygienic requirements for organization of work and rest, diet taking into account the body's biorhythms. The issues of generating the health-preserving educational process are considered, specifically hygienic requirements for using computer and user risk factors.

We consider it expedient to address the today's pressing hygienic issues resulting from scientific and technical progress and included in the existing academic passport for 3.2.1. Hygiene, such as aspects of information and analytical hygiene, hygiene of health preservation, in the lectures for future experts in preventive medicine.

Faculty of Pharmacy

Three lectures at the Faculty of Pharmacy with the overall complexity of the Hygiene academic discipline of 72 h or two credit units involve only a general review of basic hygiene issues given the fact that teaching the subject is aimed to make students familiar with the common patterns of influence of environmental factors, working conditions and schedule of employees of pharmacies and pharmaceutical enterprises on the body. One lecture on the specialty is devoted entirely to the fundamentals of sanitary improvement of pharmacies and occupational hygiene of pharmacists, including occupational hazards, occupational diseases of employees, arranging health promotional activities. Information about the issues included in the curriculum is available from the Moodle digital educational environment.

Thus, mastering the academic discipline "Hygiene" by the students takes place considering the specifics of different faculties. The common trends imply reduction of lecture hours and increasing the time for practical classes and extracurricular work. For example, students learn the issues related to hygiene of soil on their own due to reduction of lecture hours on the discipline. Work continues on updating the lectures considering the issues that are most difficult for students aimed at improving the teaching of academic disciplines.

Innovative methods to teach hygiene within the framework of competence-based approach to teaching

In today's conditions of competence-based approach to teaching working with students involves implementation of modern teaching methods into educational process, including interactive methods [11–24]. The latter are aimed to improve the students' motivation toward educational and professional activities. Conditions have been created at the Department for manifestation of the creative initiative that forms and develops the interest for academic discipline and stimulates self-search for necessary information. We use various pedagogical techniques that contribute to organization of the students' joint action under conditions simulating the real situation. One of the methods to ensure the students' active learning is the method of situational tasks or the case-study method based on assessing and resolving a problematic situation. The students are offered to think about a real situation that not only reflects certain practical issue, but also actualizes some body of knowledge needed to solve the problem.

One more pedagogical technology represents working in small groups allowing the members to improve their educational interest and master business communication. Students develop critical thinking when working in groups (teams), which implies the abilities to acquire data, compare, match the data to the earlier studied phenomena, build the logic of evidence-based solution of the problem under consideration, etc. Small training groups construct new knowledge together, they do not acquire ready-made knowledge. The teacher's task is to involve all students into generating a real work product together. Laboratory work enabling integration of theoretical knowledge and practical skills is an example of such training. Students united in small groups do laboratory work with the teacher's advisory and methodological assistance.

Business (role-playing) games make it possible to involve all students and ensure group cohesion. Educational material is effectively mastered, communicative and social skills and abilities necessary for mastering future profession are formed. A business game for the section "Hygiene of Nutrition" on the topic "Food Poisoning" is an example [25], which is targeting general practitioners and pediatricians. Its essence lies in formulating a preliminary diagnosis by the clinician based on the anamnestic data and the "patient's" complaints. The teacher's task is to distribute functions among students of the group in the business game. The teacher promotes developing the skills of interviewing the affected individual, helps to establish a correct diagnosis by asking additional questions, guides the "physician's" thoughts during differential diagnosis of food poisoning, notes students, who are the most competent when playing their roles in the business game.

Active methods to acquire knowledge also include making movies vividly demonstrating educational content. Videos prepared by teachers and students together are considered to be the best variant. In doing so, high students' commitment to selection and presentation of materials on the issue is formed. Hyperlinks to videos are hosted on the Moodle platform. Discussion of material can be arranged in addition to watching a video. During the discussion the teacher can figure out various viewpoints on the issue and guide students to the right conclusion from the discussed issue in a well-argued manner. Active discussion makes it possible to organize the knowledge and draw conclusions correctly.

The above allows us to draw a conclusion about differentiation of students' training at the Department of General Hygiene of VSMU. The issues of special hygiene (for example, hygiene of dental specialty institutions, hygiene of pharmacies and pharmaceutical enterprises, etc.) are in more detail analyzed for students of appropriate faculties. During practical classes at the faculties of general medicine and pediatrics hygienic requirements for project documentation of medical institution are considered, that of dental clinic are considered at the Faculty of Dentistry, of pharmacy at the Faculty of Pharmacy; standards for the design of various construction objects are considered at the Faculty of Preventive Medicine.

Hygiene teaching update in accordance with the updated standards and legislation

The educational process organization is compliant with the requirements of educational and professional standards for the specialties available at the university, which enables developing a hygienic way of thinking and acquisition of solid knowledge on the academic discipline “Hygiene” by students. The research fields set out in the academic passport for 3.2.1. “Hygiene” are considered.

However, the today’s standards of training physicians do not fully take into account the latest trends in hygiene development, its achievements, new methodological and informational approaches, as well as the technology to provide sanitary and epidemiological well-being of the population. We believe that further update of educational and professional standards for specialties will enable orientation to the relevant issues of medical practice, which, in turn, will improve the quality of educational process in the medical university. The thematic plan should be revised taking into account socio-economic changes in society, changes in the regulatory framework governing the activities of the sanitary and epidemiological service, adoption of new laws and/or amendments related to the living environment.

Compilation of the work programs of academic disciplines for various faculties makes it possible to clearly define the issues taught within the framework of a single discipline considering the knowledge acquired by students when learning the preceding disciplines, thereby outlining the systematic nature and sustainability of teaching. The professional and educational trajectory of future hygienists and epidemiologists takes into account the teaching continuity from fundamental theoretical disciplines to clinical and relevant for the specialty ones [4, 26, 27]. Hygiene arms students with the basic knowledge essential for further formation of qualified specialists in preventive field of medicine. The subsequent teaching of hygiene of nutrition, occupational hygiene, radiation and communal hygiene it built on the basement founded during the study of the discipline at the Department of General Hygiene. The teaching continuity at the Faculty of Preventive Medicine of VSMU is reflected in the handbook for students’ extracurricular work with innovative implementations and abstracts of the lecture courses for various disciplines.

It is necessary to issue differentiated Hygiene tutorials and workshops to improve teaching of hygiene. The use of innovative teaching methods, such as the problem-based exposition of material, increases the interest in the subject and enhances cognitive activity, thereby promoting successful mastering the discipline [4, 21, 25].

Students’ research work as a method to improve their professional qualification

According to the last generation FSES, students’ research work is part of training of physicians in the specialty “Preventive Medicine”. Engaging students in research reinforces motivation for learning hygiene within the framework of educational process. Cooperation of teachers at various departments and the sanitary service specialists in organizing the shared circles and conferences is also aimed at improving the students’ professional qualification level. Such measures expand the future physicians’ understanding of modern hygienic issues and form practical skills of hygienic diagnosis of the environment.

CONCLUSION

Integration of efforts between the academic staff and practical healthcare professionals, complex use of conventional, innovative and digital methods to teach hygiene ensure high-quality training of future physicians of various specialties.

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