

SIMULATION GAME TO EDUCATE MEDICAL STUDENTS ABOUT HEALTHY LIFESTYLE

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The aim of this study was to provide a rationale for and to assess the effectiveness of a simulation game in educating medical students who take a course in hygiene-related disciplines about the healthy use of electronic devices. The game was designed by the Department of Hygiene and focused on teaching skills for healthy use of ED. The game was a roleplay simulation, in which students played the role of doctors educating various populations (preschoolers, schoolers, college and higher institution students) about good hygiene practices. The study recruited 220 healthcare workers and 256 medical students. Inclusion criteria: informed consent to participate; submitting a properly completed questionnaire. Statistical analysis was conducted in Statistica 13.0. Of all the healthcare workers participating in the study, 30.0% did not have skills for using electronic devices healthily. The students gave 6.1 ± 0.09 points out of 10 to their commitment to a healthy lifestyle and 5.6 ± 0.12 points out of 10 to their willingness to educate their patients about healthy living. The proposed simulation game helps medical students to develop universal and generic professional competencies needed to lead and promote a healthy lifestyle. The game improves motivation to study, ensures better visibility of learning materials and opens up opportunities for creativity and initiative.

Keywords: students, simulation game, electronic devices**Author contribution:** Milushkina OYu, Skobolina NA supervised the study; Markelova SV collected data for the study, performed statistical analysis and wrote the manuscript; Fedotov DM, Kaminer DD analyzed the literature; Ievleva OV, Savchuk PO collected data for the study.**Compliance with ethical standards:** The study was approved by the Ethics Committee of Pirogov Russian National Research Medical University (Protocol № 159 dated November 21, 2016 and Protocol № 203 December 20, 2020). Voluntary informed consent was given by all study participants. Participation in the online survey was voluntary. The study followed the principles of biomedical ethics and did not pose any danger to the participants.✉ **Correspondence should be addressed:** Svetlana V. Markelova
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ДЕЛОВАЯ ИГРА КАК МЕТОД ПОВЫШЕНИЯ ИНФОРМИРОВАННОСТИ ОБУЧАЮЩИХСЯ МЕДИЦИНСКОГО ВУЗА О НАВЫКАХ ЗДОРОВОГО ОБРАЗА ЖИЗНИ

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Целью исследования являлось обоснование необходимости и оценка эффективности использования деловой игры для повышения информированности обучающихся медицинского ВУЗа о навыках здорового образа жизни при использовании электронных устройств в рамках преподавания дисциплин гигиенического профиля. На кафедре гигиены педиатрического факультета РНИМУ им. Н. И. Пирогова разработана деловая игра «Формирование навыков безопасного использования электронных устройств». Деловая игра является «имитационно-ролевой», обучающиеся исполняют роли «врачей», которые проводят гигиеническое воспитание для контингентов различного возраста (дошкольники, школьники, обучающиеся колледжей, ВУЗов). В исследовании приняли участие 220 медицинских работников и 256 обучающихся. Критерии включения — наличие информированного согласия, корректно заполненный опросник. Статистическая обработка данных проводилась с использованием Statistica 13.0. У 30,0% опрошенных медиков не сформированы навыки безопасного использования электронных устройств. Обучающиеся охарактеризовали свою приверженность здоровому образу жизни на $6,1 \pm 0,09$ балла, а готовность давать рекомендации по здоровому образу жизни пациентам на $5,6 \pm 0,12$ из 10 возможных. Деловая игра способствует формированию универсальных и общепрофессиональных компетенций, направленных на формирование навыков ведения здорового образа жизни и пропаганды здоровьесбережения у будущих врачей. Проведение занятий в форме деловой игры повышает мотивацию к обучению, обеспечивает большую наглядность представления учебного материала и возможность проявления творческой инициативы.

Ключевые слова: обучающиеся, деловая игра, электронные устройства**Вклад авторов:** Милушкина О.Ю., Скоблина Н.А. — научное руководство, Маркелова С.В. — сбор материала, статистическая обработка, написание статьи; Федотов Д.М., Каминер Д.Д. — анализ литературы; Иевлева О.В., Савчук П.О. — сбор материала.**Соблюдение этических стандартов:** Данное исследование было одобрено ЛЭК РНИМУ им. Н. И. Пирогова (Протокол № 159 от 21.11.2016 года и Протокол № 203 от 20.12.2020 года). Добровольное информированное согласие было получено для каждого участника. Проведение онлайн-опроса взрослого населения проводилось на добровольной основе с использованием онлайн-сервиса. Исследование соответствовало требованиям биомедицинской этики и не подвергало опасности участников.✉ **Для корреспонденции:** Маркелова Светлана Валерьевна
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Simulations games are used in higher educational institutions as an active learning technique for modeling professional activities. A simulation game encourages its participants to look for solutions to professional challenges, helps them to attain educational goals and facilitates personal growth [1, 2].

In a simulation game, students are actively engaged in a search for new information, but their teacher does not act as

the main source of information, although he/she guides and controls the learning process. Importantly, a simulation game involves thinking, action, speech acts, emotional and personal perception, i.e. all types of activity a student should engage in [3, 4].

In the past few years, educational programs for medical students have been implemented amidst the transition to

updated third-generation federal academic standards for higher education. Some of them were approved in 2017 and 2018, but most took effect in 2020. According to these standards, a higher educational institution graduate is expected to have a range of universal, generic and domain-specific professional competencies. For example, a pediatric specialist is expected to have expertise in hygiene allowing him/her to educate the population about good hygiene practices and find solutions to challenges associated with disease prevention. Besides, a pediatric specialist is expected to have mastered a competency in health protection (a universal competency UK-7) and healthy lifestyle (a generic professional competency OPK-2) [5].

The Priority Project on promoting healthy lifestyle and improving public health is to be implemented by 2025 [6]. The project seeks to increase the number of Russian residents leading a healthy lifestyle to 60% by 2025 and thus dictates the importance of finding novel approaches to teaching hygiene-related disciplines. The development of health protection technologies is one of the goals of the Project for basic research that will be implemented in Russia in 2021–2030 [7].

Simulation games have been used at our Department of Hygiene (Faculty of Pediatrics, Pirogov Russian National Research Medical University) since 2018. So far, the Department has amassed some experience in educating its students about the healthy use of electronic devices (ED); this experience needs to be analyzed and summarized.

The aim of this study is to provide a rationale for and to assess the effectiveness of a simulation game in educating medical students who take a course in hygiene-related disciplines about the healthy use of electronic devices.

METHODS

We started off by conducting a survey among 220 healthcare workers from 19 Russian regions in order to assess their awareness of health risks associated with ED. The staff of the Department of Hygiene certified in hygiene education, general hygiene, hygiene of children and adolescents, and epidemiology had designed questionnaires distributed via Google Forms [8]. The respondents were asked about the risks associated with excessive use of ED and skills necessary to use ED healthily. The following inclusion criteria were applied: being a healthcare worker; a properly completed questionnaire. Exclusion criteria: other occupation; the absence of a properly completed questionnaire.

Having analyzed the questionnaires returned by the respondents, we identified the major problems related to the lack of skills allowing healthcare workers to use their ED healthily. These data were used to design questions for the simulation game.

In the second phase of the study, we recruited 256 second-year medical students of the Faculty of Pediatrics. The game offered to the students had been designed by the Department of Hygiene and focused on teaching skills for healthy use of ED. The game was a roleplay simulation, in which students played the role of doctors educating various populations (preschoolers, schoolers, college and higher institution students) about good hygiene practices. Time allocated for the game was 90 min.

The game was played by 128 participants (the main group). Classic teaching techniques were used in the control group ($n = 128$). The following inclusion criteria were applied: a student of Pirogov Russian National Research Medical University; voluntary informed consent to participate. Exclusion criteria: not being a student; failure to give informed consent to participate. In addition, 5 teachers took part in the game as

facilitators. The effectiveness of the game was assessed based on the academic performance of the participants.

No human rights were violated during the study; the study did not pose any danger to its participants and complied with the principles of biomedical ethics formulated in the Declaration of Helsinki and the European Council Directive 8/609 EC. The study was approved by the Ethics Committee of Pirogov Russian National Research Medical University (Protocol № 159 dated November 21, 2016 and Protocol № 203 December 20, 2020).

Statistical analysis was conducted using descriptive statistics, the Mann–Whitney U-test, in Statistica 13.0 (StatSoft Inc.; USA). Differences were considered significant at $p \leq 0.05$.

RESULTS

The respondents (healthcare workers) were asked to answer a series of questions about the eye health of today's children, adolescents and young people; 65% of the respondents described the vision of the younger generation as "satisfactory" or "poor". This suggests that healthcare workers realize there is a problem.

When asked "How often do you take a break from the screen when working with an electronic device?", 41.8% of the respondents said they took a break once every 30–60 min, which meets the principles of good eye hygiene. Others said they took breaks less frequently, and 19.1% of the respondents admitted they did not take any screen breaks at all. Only 14.1% of the respondents said they would not work on their ED in dim lighting, adhering to the principles of good eye hygiene. But 35.5% of the respondents were ready to work in any lighting conditions. Of all the respondents, 47.3% had an organized workstation where they could use their ED. Others said they could use ED in bed, etc.

About 40.0% of the respondents said they could not spend a single day without ED. At the same time, the rest reported they could eliminate ED from their daily activities at least once a week, for example at the weekend. For healthcare workers, the primary source of information about healthy lifestyle was the Internet (55.9%), professional literature (47.7%), and colleagues (30.5%); 6.4% of the respondents were not interested in healthy lifestyle.

To improve their health, most of the respondents avoided unhealthy habits (55.5%), ate healthily (41.4%) and maintained a work-rest balance (35.90%); 15.9% of the respondents did nothing to improve their health. Considering the obtained figures, we conclude that about 30% of healthcare workers do not know how to use ED healthily.

Thus, a lot can be done to educate future healthcare workers about the risk factors associated with ED and healthy lifestyle while they are still students. Commitment to a healthy lifestyle would indeed be an inspiring example to their patients.

That said, students gave 6.3 ± 0.09 points out of 10 to the health risks of ED, 6.1 ± 0.09 points out of 10 to their commitment to a healthy lifestyle and 5.6 ± 0.12 points out of 10 to their willingness to educate their patients about healthy living. This suggests the importance of including the proposed simulation game Skills for healthy use of ED in the learning process.

Based on the obtained data, we identified the main problems associated with the use of ED to be included in the simulation game: work-rest balance, lighting conditions, workstation organization. Visuals for the simulation game included posters, memos written by the students, information on the prevention of risks associated with technical and

audiovisual characteristics of ED (EM field, air ionization, screen size, screen brightness, etc.), indoor environment in the room where ED are used, workstation ergonomics, work-rest balance, information about prophylaxis and rehabilitation for those whose sight is already declining (the recommendations are available on the official websites of the National Medical Research Center for Therapy and Preventive Medicine, the Center for Public Hygiene Education of Rospotrebnadzor and other organizations working in the field of preventive medicine. So, the players learnt to use Internet resources developed by the leading experts that provide information on various aspects of learning and promoting a healthy life style among different populations.

The analysis revealed that our simulation game had improved the students' motivation to study. In the main group, the students received 9.8 ± 0.07 points out of 10 for their academic performance during the class, whereas in the control group, the students received 8.9 ± 0.08 points out of 10 ($p = 0.001$). Besides, the players reported a subjectively better understating of the visually presented information and said the game gave them better opportunities for creativity and initiative.

DISCUSSION

ED are increasingly used by different groups of the population at school, at work, and outside the workplace. This means, the users should have skills allowing them to use ED safely and healthily. Medical students are expected to develop these skills as part of their competencies associated with promoting a healthy lifestyle and protecting public health [9–12].

Previously, simulation games demonstrated a good effect as a tool for teaching other medical disciplines. This active learning technique was reported to improve motivation to study, allow students to translate accumulated knowledge into actual practice, promote systematization of the obtained knowledge, and provide general understanding of the medical science [13–15].

The analysis of experience amassed by the faculty shows that simulation games improve motivation to study and increase the effectiveness of the learning process.

With regard to teaching hygiene-related disciplines, simulation games can be integrated into the modules that focus on healthy lifestyles, healthy eating, the rational use of information and communication technologies, hygienic aspects of prevention of infections and non-infectious diseases. The choice of modules depends on their significance for "field work", i.e. educating the population about good hygiene practices. It is also important to consider the visibility of the learning materials, the level of independence the student has in the game and the realization of the importance of this activity by the student.

CONCLUSIONS

This study demonstrates the need to bring more attention to the problem of educating medical students and healthcare workers about the healthy use of ED. The study proposes an effective solution: a simulation game that can be integrated into the process of learning hygiene-related disciplines. This active learning technique could encourage future healthcare workers to lead and promote a healthy lifestyle.

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