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IMPLEMENTATION OF MODULAR TRAINING IN THE SYSTEM OF SIMULATION TEACHING IN HIGHER MEDICAL INSTITUTIONS

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Abstract
Simulation training in a number of complex, life-threatening professions of the 20th century, such as mine clearance, aerobatics training, aerospace production, military industry, radiation technologies, especially when preparing astronauts for flights, has achieved good results and received worldwide recognition. Creating situations that are close to natural when performing tasks, representatives of these professions during simulation training in the field began to get used to these loads on special simulators. Thus, in medicine, the examination of patients showed that there is a need for simulators on which students and novice doctors could study and provide first aid accurately, completely and hundreds of times so that they fully master the procedures of diagnosis, treatment and first aid, and their actions should be brought to automatism. Thus, the widespread use of simulators in future medical education is open, even if it is expensive.

Keywords: Simulation, simulators, bring to automatism.

ВНЕДРЕНИЕ МОДУЛЬНОГО ОБУЧЕНИЯ В СИСТЕМУ СИМУЛЯЦИОННОГО ОБУЧЕНИЯ В ВЫСШИХ МЕДИЦИНСКИХ УЧРЕЖДЕНИЯХ

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Резъюме: Симуляционное обучение в ряде сложных, опасных для жизни профессий 20-го века, таких как разминирование минных полей, подготовка к полетам по высшему пилотажу, аэрокосмическое производство, военная промышленность, радиационные технологии, особенно при подготовке астронавтов к полетам, достигло хороших результатов и получило мировое признание. Создавая ситуации, приближенные к естественным при выполнении задач, представители этих профессий во время имитационных тренировок на местах начали

привыкать к этим нагрузкам на специаль ных тренажерах. Таким образом, в медицине обследование пациентов показало, что существует потребность в тренажерах, на которых студенты и начинающие врачи могли бы учиться и оказывать первую помощь точно, полностью и сотни раз, чтобы они полностью овладели процедурами диагностики, лечения и оказания первой помощи, и их действия должны быть доведены до автоматизма. Таким образом, открыто широкое использование тренажеров в будущем медицинском образовании, даже если это дорого.

Ключевые слова: Симуляция, тренажеры, довести до автоматизма.

Introduction

Simulation training in a number of complex, life-threatening professions of the 20th century such as minefield clearance, preparation for flights in aerobatics, aerospace production, military industry, radiation technology, especially in preparing astronauts for flights, has achieved good results and has received worldwide recognition. In simulation exercises, cosmonauts and jet aircraft test pilots brought their professional actions to the point of automatism; the unerring actions of these people allowed them to endure the most severe overstrain of the functions of organs and body systems and quickly recovered after flights. Creating situations that are close to natural when performing tasks, representatives of these professions, during simulation training on the ground, began to get used to these loads in special simulators. The current situation required the creation of simulators for this technology, and therefore complex simulators were created in the aviation and aerospace fields. Pilots and cosmonauts first trained hundreds of times on simulators, and if necessary, thousands of times, then adapted and then performed, and good results were achieved. Thus, in medicine, examination of patients showed that there is a need for simulators on which students and novice doctors can learn and first aid accurately, completely and hundreds of times so that they fully master the procedures for diagnosis, treatment and first aid and their actions must be brought to automatism. Thus, open to the widespread use of simulators in future medical education, even if it is expensive [1,3,5,6,12,14].

One of the hallmarks of the last decade in Uzbekistan has been the rapid introduction of many virtual simulation technologies into various spheres of human activity. In the education system, elements of simulation education are being introduced, in the form of rooms with mannequins, simulators, which represent the processes of professional activity of medical personnel, situations and other aspects to be studied are modeled with a certain degree of reliability. Phantoms and simulators began to be used in some educational institutions in the 90s, and the introduction of complex virtual simulators into their use management systems in education appeared only in the last decade [3,6,13,16,17]. According to the study of this system, neighboring countries have accumulated sufficient experience in the use of simulation methods in education, including in medicine. These technologies made it possible to create a simulation training system based on experience gained abroad. Thus, a system of education of medical specialists has been created to provide safe, effective, high-quality medical care to the population [4,11,14,15]. Today, the relevance of simulation training is recognized throughout the healthcare sector and a very favorable environment has been created for the creation of a medical simulation cluster. Studying the achievements of advanced foreign colleagues in this area and in the

last 10 years, avoiding blind copying of the experience of foreign doctors, special attention is paid to simulation modular training in Uzbekistan [1,2,5,7,9].

The purpose of this study is to show the most important advantages of new simulation learning technologies.

The objectives of our work were:

– study and learn without causing harm to the patient, and use simulation training methods to objectively assess the achieved high level of professional training of each specialist;

- coverage of all areas of competence of a specialist who assesses the level of practical skills of a medical worker.

The education system of medical specialists in Uzbekistan contributes to the improvement of medical care, but cannot provide an assessment of the degree of qualification of doctors and nurses, since these measures cover all areas of competence of a medical specialist. The introduction of training level control through a simulation training system can solve this problem. The main task of the simulation training system should be the task of training well-trained specialists for medicine [8,10,12]. Theoretical and practical training of medical workers is ensured by their participation in medical activities under the guidance of personnel of educational organizations. It is becoming increasingly difficult for students and young doctors to obtain patient consent to participate in their medical care. The introduction of an additional, but mandatory stage of certification of each student and young doctor in the conditions of modeling professional activity, as well as the dissemination of information about all the possibilities of this stage of professional training among patients can radically change this situation. [5,6,9]

Doctors starting their practice need quite a long time to master the practical skills of performing various medical interventions, for example, a doctor specializing in endovideosurgery must participate in performing from 50 to 200 laparoscopic cholecystectomies and 40-60 fundoplications, etc. [4, 8,11,13]. It is generally accepted that training in the practical skills of a doctor includes the following options: work on animals, cadavers, with the participation of patients (supervision and assistance during operations). All these forms of training have significant drawbacks - when working with animals, it is necessary to create and maintain a vivarium, pay its employees, purchase animals; at the same time, the number and time of manipulations is limited, constant individual control of the teacher is necessary, with a subjective assessment of the student's work there are organizational problems, the use of drugs, objections from animal rights activists due to ethical problems of working with animals. Currently, practicing on corpses is very difficult and inconvenient; this requires the organization of a special service.

To learn practical skills for carrying out an operation, it is necessary to repeatedly perform practical skills 100-200 times under the supervision of a teacher. Therefore, the student needs to participate in operations as an assistant operator 60-100 times. Finally, due to the risk of harm to the patient and the risk of developing iatrogenic complications, it should be considered impossible to carry out and perform basic practical skills in the presence of patients [13,15]. In this regard, the only effective and safe way to develop practical skills at present is simulation of training provided by virtual technologies. Situations simulated on a computer actively respond to the actions of the trainees and

fully simulate the patient's physiological reaction to the doctor's actions or reproduce the adequate tissue response to the surgeon's manipulations. Practitioners who have acquired practical skills in using virtual simulators, who have mastered these skills to the point of automatism, will be able to perform these interventions faster and more confidently, and their subsequent real results will be higher. In addition, computer modeling based on objective data from a real patient (MRI, CT, ultrasound, etc.) allows you to predict and even practice future research or surgery, which reduces potential risk and improves the quality of medical care [5]. Currently, dozens of companies around the world produce virtual simulators for many medical specialties. Virtual simulators have a number of undoubted advantages over the training options mentioned above - there are no ongoing financial costs, the duration and mode of training are not limited in time, training can be repeated automatically. Instantly and with an impartial qualitative and quantitative assessment, until full mastery and consolidation is achieved, the constant participation of the teacher is not required, methodological recommendations are given automatically, the simulator program itself automatically directs to the correct actions and indicates the correction of errors, objective certification is carried out. The first studies conducted by N. Seymour [11], T. Gancharov [7, 11] show the advantages of virtual simulators. According to the authors, the use of a virtual simulator during the training process reduces the number of errors made by trainee surgeons during their first laparoscopic operations by 2.5 times. The results of the study confirm the validity of introducing virtual simulation technologies into medical education and advanced training programs. The realism of simulation equipment used to train medical personnel is divided into seven levels [6,10,13]. When developing simulators, each subsequent level is more difficult to implement. According to these levels of realism, all simulations can be classified:

1. When using visual, traditional teaching technologies - diagrams, printed posters, models of the human anatomical structure. In addition, these can be very simple e-books and computer programs. The basis of any practical skill is visual and simulation training.
2. Passive phantom reaction - reaction during repetition. At the same time, manual skills, coordination of actions and their sequence develop. Thanks to real imagination, you can bring individual manipulations to the level of automatism.
3. Reactive - when the simplest active reactions of the phantom to the actions of the student are repeated. Assessment of the correctness of students' actions is carried out only at a basic level. Such mannequins and simulators are made of plastic, filled with electronic controllers, and the movements of students are controlled electronically.
4. Automation is the mannequin's reaction to external influences. Such simulators use computer technology based on scenarios, where a phantom clearly responds to certain actions. develop the cognitive mind.
5. Equipment for a medical office, operating room. Thanks to such training systems, a reliable ability to act in such a reality is achieved.
6. Interactivity – complex interaction of the simulation manikin with medical equipment and the trainee. Automatic changes in the physiological state of the artificial patient, adequate response to medication and immediate reaction to incorrect actions. At this level, the listener's competence can be directly assessed.

7. Interaction of integrated simulators and medical devices. During practice, virtual simulators show all the necessary indicators[6,10,13].

Simulation training in medical education is a modern training and assessment technology based on realistic modeling of practical skills, simulating a clinical situation - for this purpose, teaching models of varying complexity and realism are used.

The influence of simulation training on the degree of retention of learned practical skills was determined by Bonrath in 2010 (6 mastered skills: accuracy, speed)[11]. He defined the degree of preservation or certification at various times:

1. Skills recertification after 6 weeks: 8 out of 9 skills retained.
2. If re-certified after 11 weeks: 4 out of 9 skills are retained.

CONCLUSIONS:

1.For continuous deep acquisition of practical skills, longer work with simulation of the technology of operations and frequent updating of skills is required.

2. Modular training in simulation medicine allows you to train highly qualified specialists in a short time.

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