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SIMULATION TRAINING IN THE HEALTH EDUCATION SYSTEM AND DEVELOPMENT TRENDS

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ABSTRACT

The article provides information about simulation education and its importance in medical education, development principles and the role of simulation training centers. At the same time, the stages of implementation of the simulation process in medical education in foreign countries, its specific aspects are covered. Based on didactic approaches, information is provided on the integration of the simulation process with the assessment system, its features and assessment indicators.

Key words: simulation, simulation education, simulation centers, didactic approaches, indicators, trends.

INTRODUCTION

Over the years of independence in the Republic of Uzbekistan, a huge amount of work has been done to reform the entire education system, including the health care personnel infrastructure. At the same time, an extremely important role in improving the quality of medical care and the formation of a highly qualified specialist is assigned to the issues of advanced training and retraining of doctors, the introduction of new pedagogical technologies and innovations, modern technical teaching aids using information technologies [2,3]. Decree of the President of the Republic of Uzbekistan No. PD-5590 dated 07.12.2018 "On comprehensive measures to radically improve the health care system of the Republic of Uzbekistan, the Concept for the development of the health care system of the Republic of Uzbekistan for 2019-2025, Resolution of the President of the Republic of Uzbekistan No. 4310 dated 06.05.2019" On measures on the further development of the system of medical and pharmaceutical education and science ",

No. 2909 dated April 20, 2017" On measures for the further development of the higher education system "in order to radically improve the higher education system, radically revise the content of training in accordance with the priority tasks of the socio-economic development of the country, ensuring the necessary conditions for the training of specialists with higher education at the level of international standards, No. 2956 of May 5, 2017 "On measures to further reform the system of medical education in the Republic of Uzbekistan" is aimed primarily at improving the quality of medical education and the formation of a system of higher and secondary specialized, professional medical education at the level of international best practice, increasing the level of medical care , No. 3071 of June 26, 2017 "On measures for the further development of specialized medical care for the population of the Republic of Uzbekistan for 2017-2021", No. 3151 of July 27, 2017 "On measures to further expand the participation of industries and sectors of the economy in improving the quality of training with higher education ", No. 3775 of June 5, 2018 "On additional measures to improve the quality of education in higher educational institutions and ensure their active participation in the ongoing large-scale reforms in the country" directed primarily to improve the quality of medical education and the formation of a system of higher and secondary specialized, professional medical education at the level of the best international practice, to increase the level of medical care.

The level of development of each sector of the industry directly depends on the training of personnel in this direction. Installation of modern technology, introduce innovative technologies, the implementation of the reconstruction of buildings, the improvement of the modern management system, without qualified personnel training will not give serious positive changes. Everywhere in the industry there is an acute shortage of highly qualified specialists, therefore, it is natural that one of the main directions in the field of higher medical education is the need to significantly strengthen the practical aspect of training future doctors, while maintaining the proper level of theoretical knowledge [1,5].

The weak level of training of doctors and specialists is one of the urgent problems of improving the quality of the provision of qualified medical care to the population. To strengthen the personnel, work is being carried out both within the republic and abroad.

In order to solve such problems, in many countries there have been global changes in priorities in medical education: from structure to process, and in the last decade - to educational result. This was characterized by the active introduction of new learning technologies, such as problem-based, electronic, mixed, command, simulation and others. However, it is necessary not only to use innovative teaching technologies, but to achieve, thanks to them, specific measurable results that can be demonstrated by students [4,7].

In foreign educational practice, a methodology for teaching students of medical institutions has appeared for a long time on the basis of played situational tasks using modern innovative educational technologies, with the maximum approximation to real conditions.

Thus, a distinctive feature of medical education is the mandatory development of practical (clinical) skills "at the patient's bedside" (case management, participation in clinical rounds, operations, manipulations, etc.). In this regard, a prerequisite for high-quality training of doctors is the integration of education and production, in this case, medical universities and clinics of leading centers. That is, leading medical institutions use medical universities as clinical bases. In teaching students, not only university teachers are involved, but also scientists and experienced doctors [1,8,19].

A student - a future specialist must master and well recognize a large number of diseases. But he has no opportunity to see a sufficient number of patients in the clinic, spend sufficient time with them, communicate, observe certain symptoms. In addition, medical students must cope with life-threatening conditions on their own, especially now, when, after the sixth year, they go out on their own. But in practice, a young specialist will not be given the opportunity to practice on patients and, accordingly, experienced doctors provide assistance to patients, while students remain, at best, in the role of observers, unable to master the skills and competencies associated with the provision of medical care. It is to solve these problems of medical education that simulation technologies are needed: so that without harm to the patient's health, it was possible to work out all the algorithms, practical skills, teach students and doctors to act in emergency situations. This is important, among other things, for the development of currently developing minimally invasive methods of treatment, for the effective use of medical equipment. Moreover, a student should come to a sick person with already worked out practical skills - when the hand is placed, there are developed algorithms, certain skills that have grown into skills.

Thus, with imitation training makes it possible to get acquainted with all the diseases provided for by the curriculum, regardless of whether there is a patient with pronounced symptoms in the clinic at that time or not. And most importantly, when teaching students using simulation technologies, there is the possibility of a planned practice for each of them. Simulation includes activities aimed at developing practical skills, algorithms and communications [1,2,6].

Thus, the priority area for the development of innovative technologies in the field of education in medical institutions is:

- the introduction of simulation technologies into the practical training of students of medical universities makes it possible to avoid mistakes in the process of providing medical activities;

- strengthening the practical training of students should begin already from the first year and continue throughout the educational process, consolidating the knowledge gained in practice, especially those that are associated with an increased risk for the patient. Simulators allow you to repeat each skill many times in identical conditions, and, if necessary, recreate a specific clinical scenario;

- simulation training makes it possible to objectively control knowledge and skills, which makes it possible to compare theoretical knowledge with the quality of a specialist's practical work;

- interaction with foreign colleagues to exchange experience, improve the methodology of simulation training;

- will increase the attractiveness and effectiveness of educational events (courses, thematic improvements, master classes) for practical health professionals in the system of continuing medical education, as well as for other contingent of students on the provision of first aid.

Simulation and simulation training in medicine. Simulation- this is an imitation of the execution of a real process or system operation for a certain time. Simulation is used in many contexts, such as simulating technology to optimize performance, security design, testing, training, education, and video games. The use of simulation as a method for acquiring practical skills and learning is called simulation.training [5,7,17]

Medical skills are acquired through cognitive (knowledge) and psychomotor skills (practice). Basic clinical theoretical training for health care providers includes non-technical skills such as communication, clinical judgment and planning. To master and improve technical / psychomotor skills and communication skills, constant practice and simulation is required, which allows you to bring the technique of performing these techniques to automatism. The use of simulation techniques and methods in medical education is called simulation learning.in medicine (COM).

Simulation centers. Simulation Centers (SC) or Clinical Skills Laboratory (CSL) Is a training center for medical students (in universities) or medical professionals (in the postgraduate education system), which provides an opportunity to learn and practice skills and manipulation in a safe and protected environment.

The simulation center can be used by medical students (for example, in the study of anatomy, physiological functions, familiarization with the methods of medical examination), residents (for example, to master and improve the skills of performing manipulations and techniques, in preparation for practical replacements, in retraining courses, exams to confirm certificates, etc.), in the continuous training of doctors or nurses (for example, the acquisition of practical skills, competence in teamwork) or to test competence before hiring [6,9,20].

Simulation tools. Simulation education in medicine (SEM) involves the use of some tools. They can be divided into three main categories:

Standardized patient: a person trained to play the role of the patient with a certain history of the disease and with certain pathological conditions; used primarily for practice of taking anamnesis and communicating with patients; also used required for practical examinations- This type of examination is called OSCE (Objective Structured Clinical Examination).

Models: static simulation tools designed to master specific manipulations and methods; usually represent specific parts of the body (e.g. measures, arm, head, and pelvis.)

Simulators / Simulators: similar to those described above, but additionally can be provided give feedback to the user; usually connected to computers and are

equipped with interfaces that allow you to change configuration, simulate scenarios and receive various types of patient feedback, for example, vital signs - heart rate, blood pressure, oxygen saturation - and clinical signs such as chest expansion or cardiorespiratory auscultation [7,10,15]

Didactic approaches. During training, several didactic approaches can be applied in the clinical skills laboratory. Listed below some of the approaches used for simulated teaching in medicine:

Objective Structured Clinical Exam (OSCE): OSCE Is a type of exam designed to test competence and perform practical skills such as communication, clinical examination, medical procedures / appointments, exercise prescription, etc. It is handed over with real or "imaginary" patients (patient-actors), passing through several points, for each of which its own examiner is assigned and a certain time is allocated.

Briefing debriefing: the briefing is about presenting the scenario that needs to be accomplished, as well as related protocols and guidelines. It brings the listeners into context and offers an overview of what will happen when the script is executed.

Debriefing is a kind of feedback process that promotes critical reflection and constructive discussion of practical experience, listener work, behavior and decision-making.

Scenarios: scenarios simulate clinical events as closely as possible, to real life situations in a safe environment; they can be updated and adapted to the needs of each training session and specific cadets to better assimilate technical and non-technical skills. The use of scenarios allows cadets to feel themselves in a specific situation, to consolidate theoretical knowledge, skills and decision-making process in a state of stress, to prepare them for similar situations in the future [2,11,16]

Rationale for the importance of creating simulation training centers. The main goal of the healthcare system - through an organized structure, ensure health protection in accordance with reference standards and improve health at the lowest (optimal) cost. To achieve this goal, a well thought out organization is needed, ideally delineated by levels of specialization and divided by administrative regions, depending on size, demographic situation and available resources.

Currently, medical education faces a number of problems, This includes an increase in the number of students, a change in their preferences for learning styles, and the need to narrow the gap between theory and clinical practice. In addition, increasing attention is paid to patient safety, ethical issues, increased responsibility of medical professionals, a high level of required professional qualifications and the rapid evolution of procedures and methods. All this requires the adaptation of curricula using all available educational tools [4,8].

At the same time, traditional forms of medical education do not offer any specific process to ensure a completely safe and effective preparation before the medical professional begins to actively work with patients. In addition, current forms of monitoring the level of competence of doctors are mostly inconsistent or

insufficient. COM can help overcome these challenges, from tertiary or postgraduate studies to lifelong learning [11,18].

Below is shown how SEM can help achieve these goals:

- Decreased learning opportunities; Increase in the number of students;
- Reducing the working hours of junior doctors; Patient safety issues;
- Ethical issues related to the acquisition and development of skills using by real patients;
- The need to standardize learning experiences; The need for competency assessment and certification;
- The need for quick adaptation of personnel (staff turnover); Promoting high standards of medical care; Increase in the scope of medical responsibility;
- The ability to work out more or less typical clinical situations with serious consequences;
- Opportunity to promote the acquisition / development / consolidation / transfer of knowledge;
- Opportunity to promote the acquisition / development / consolidation / transfer of skills: Ability to train technical skills;
- The ability to practice the provision of medical care individually, by representatives of different professions and an interdisciplinary team (non-technical skills / team interaction);
- Opportunity to check organizational factors (training for urgent situations at work).

International experience and trends. To date, significant experience in the application of innovative educational technologies in medicine has already accumulated all over the world. Skills acquired in virtual reality are successfully transferred to a real clinical setting.

Simulation Center Mainz (AQAI GmbH (Germany)) is one of the largest private educational institutions in Europe today. AQAI makes a significant contribution to patient safety. For anesthesia, intensive care, emergency medicine, cardiology and endoscopy. In addition to the mainstream of emergency and incident management, comprehensive training and consulting services for the entire healthcare system, as well as the development of its own software. Development of new technical capabilities with all realistic scenarios and innovative teaching concepts [2, 12].

Acibadem University - CASE (Center for Advanced Simulation and Teaching) consists of Clinical Modeling and Advanced Endoscopic / Robotic Surgery Departments. With a variety of medical simulations and technological infrastructure, CASE makes a difference in both undergraduate and graduate education. In addition to medical simulation laboratories, CASE has a WetLab with nine laparoscopic surgery stations, a training center for robotic surgery and a dissection laboratory for surgical training on cadaver material.

The Institute for Clinical Innovation Technology and Teaching in Ghent (ITCIT), located at the Heymans Medical Campus in Ghent, Belgium, brings together a skills laboratory for undergraduate, graduate, postgraduate, teaching and

research in anatomical science. ITCIT focuses on research, development and implementation of innovative surgical technologies and training in a safe work environment. ITCIT is a supporting platform for existing teaching and research groups. ITCIT offers interdisciplinary and multidisciplinary training for medical students, graduate students, healthcare professionals, nurses, and patient technicians. It is designed to provide high quality preparation for daily practice.

Moscow International Medical Cluster, MIMC - located in Moscow in the territory Skolkovo Innovation Center a complex of medical clinics, educational and interdisciplinary research centers.

The cluster was created in order to develop activities for the provision of medical care, improve its quality, promote the development of drugs, medical technologies and medical devices, develop educational activities and conduct scientific research in the field of health care based on the best world practices.

The educational center of high medical technologies AMTEC KAZAN, created in Kazan, is the first project in Russia aimed at postgraduate training of medical specialists in high-tech methods of diagnosis and treatment. Since 2008, the Center has been setting new standards in the training of medical personnel, laying the foundations for the development of the concept of continuing medical education in accordance with the best world experience and assisting in expanding the population's access to high-tech medical care.

High medical technologies create a need for competent and progressive specialists.

Simulators are designed to practice the actions of a full team of doctors: anesthesiologist, operating and assisting surgeons, resuscitator and nurse. On them, you can work out the course of the operation, both by the whole brigade, and separately to each of its members.

It is in the simulation training center that certain medical skills are practiced on mock-ups in virtual reality with the help of special computer devices. Only after that, already having a certain experience, students are allowed to approach the real patient.

Low qualification of doctors means lost lives, health, ineffective use of material and financial resources. So in the UK, 850 thousand complications are recorded that are associated with the wrong actions of doctors. The damage is estimated at \$ 3 billion due to additional days of hospitalization for patients, which could have been avoided if the right treatment was immediately prescribed. In Canada, medical errors are recorded in 1 patient out of 13 hospitalized, the damage was estimated there in days - 1.1 million days of additional hospitalization. In the United States, 44 thousand, and according to some estimates, up to 98 thousand deaths are associated with medical errors. The damage is estimated according to different methods from 283 to 483 million US dollars.

Physicians trained on virtual simulators:

- surgeons - make three times fewer mistakes during laparoscopic interventions;
- gynecologists - perform gynecological operations twice as fast;

- resuscitators - reduce mortality during resuscitation measures by 40%;
- cardiologists - improve the skills of cardiological examination by 1.5 times;
- obstetricians - significantly increase the level of communication and the effectiveness of the delivery of maternity benefits.

Over the past 15 years, over 6,000 robotic patients have been purchased from more than 2,000 educational institutions around the world.

The effectiveness of simulation training is confirmed by the inclusion in the USA, Canada, Norway, Sweden of training on simulators in the mandatory list of training programs for training doctors and nurses.

Since 2007, the US Senate has passed the Law on State Financial Support for the Development of Simulation Technologies in Medical Education three times. Thus, at the moment in the United States there are more than 3 thousand educational centers for simulation training, for which more than 500 million US dollars are allocated. Also in the United States, by the FDA, simulation training is included in the mandatory training standard for doctors performing carotid stenting procedures, American anesthesiologists are certified in inhalation anesthesia on HPS robotic patients, and in Denmark, resident gynecologists are trained on a laparoscopic virtual simulator for admission to the operating room.

To date, all over the world has already accumulated significant experience in the application of innovative educational technologies in medicine. Skills acquired in virtual reality are successfully transferred to a real clinical setting.

Evaluation criteria (indicators). The main criteria for assessing the effectiveness of educational organizations implementing innovative educational programs (additional professional programs using simulation technologies) are:

1. Practical effectiveness: practical way out (focus on practical results) in relation to the medical environment - positive dynamics of indicators, productivity and efficiency of the institutions in general for the capital's health care in improving the quality of medical care.

2. Practice-oriented training: training of personnel for practical health care in a practice-oriented format with the aim of improving professional competencies, the formation of demanded knowledge, skills and practical experience for solving urgent problems in the field of providing the population with high-quality medical care.

3. Form of training: the implementation of educational programs of simulation content in full-time form contributes to the high-quality development of manual skills in conditions that realistically simulate the clinical situation, which in turn allows achieving the desired positive effect from the organization of simulation training.

4. Labor intensity of training: the timing of the implementation of educational programs and the total labor intensity of the development of programs is calculated in academic hours (academic hours), taking into account all types of classroom and independent extracurricular work of the student, quality control of the development of the program.

5. Objectivity of assessment: conducting an objective examination of the professional competence of practical health care professionals (assessment of the quality of training of specialists based on the results of mastering educational programs).

6. Continuity: regular improvement of the professional level of medical workers of the capital's health care through the implementation of educational programs of simulation content in a highly realistic educational environment[2,5,8].

The quality of professional training of a healthcare specialist is primarily determined by the extent to which the specialist is able to apply the acquired knowledge in practice. Therefore, the leading direction in the field of medical education is a significant strengthening of the practical aspect of training healthcare professionals through the use of advanced educational technologies while maintaining the proper level of theoretical knowledge. The effectiveness of the educational process is an important indicator and is an integrated measure of the quality of training and control of skills formed during training.

To assess the effectiveness of simulation training for practical health care, it is necessary to take into account the following closely interrelated indicators:

- availability and individualization of training; compliance of the structure and content of training with current needs and trends in healthcare;
- the level of technical equipment of the educational process;
- implementation of a multi- and interdisciplinary approach;
- the quality of the methodological support of the educational process;
- indicators characterizing the results of control and evaluation activities;
- expected positive changes in the field of practical health care.

Conclusions. Thus, in modern conditions, a doctor as a specialist is presented with a large list of requirements enshrined both in departmental legal norms and in the rules of social behavior. The emergence of sophisticated medical equipment and technologies, the change in moral and legal conditions in the “doctor-patient” relationship have become one of the reasons for the modernization of the medical personnel training system. This is especially true for the segment of practical training of a specialist. In this sense, simulation technologies should take an important place in medical education, increasing the quality and efficiency of practice-oriented training of a specialist, reducing the risk of negative costs of the previous education system in medical universities.

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