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SIMULATION TRAINING IN MEDICINE: THE STATE AND DIRECTION OF DEVELOPMENT OF SIMULATION TRAINING AT THE TASHKENT MEDICAL ACADEMY

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Abstract
Doctors should acquire practical skills in applying clinical situation for patients with patients in simulation departments equipped with high-tech simulators and computerized mannequins, computer games and programs that allow simulating clinical and organizational situations. One of the prerequisites for the implementation of this invention is the creation of modern simulation centers. The article deals with the problems that need to be solved for the successful and effective use of simulation training in vocational education. The chronology of medical modeling is given, in which there are many thousands and inextricably dangers with the possible development of knowledge, the progress of scientific and technological progress and military orders.
The purpose of our study is to review the chronology of simulators and the achievements of modern simulator centers.
The research methods were theoretical methods; simulation educational technologies; observation; method of scientific analysis.

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In the modern world, in the era of the rapid development of high-tech medicine, society makes high demands on the quality of medical services. It is this indicator and the quality of life of patients after treatment that should underlie the assessment of the professional activities of individual specialists and institutions, as well as the level of healthcare in general [1,5].

The classical system of clinical medical education is not able to fully solve the problem of high-quality practical training of a doctor. The main obstacles to this are the lack of continuous feedback between students and the teacher, the impossibility of practical illustration of the whole variety of clinical situations, as well as moral, ethical and legislative restrictions in communication between students and the patient.

Therefore, the key task of modern secondary, higher and postgraduate medical education is to create conditions for the development of a wide range of competencies and well-established practical skills among students without the risk of harming the patient. This includes developing the ability to make quick decisions and perform flawlessly a range of manipulations or interventions, especially in emergencies.

The creation of a wide arsenal of simulators that imitate opportunities for practical actions close to natural conditions, computer simulation of all kinds of clinical situations in the dynamics of their development opens up new horizons for practical training, advanced training and assessment of its level among students, doctors and nurses [2,4,6].

The history of medical simulation goes back many millennia and is inextricably linked with the development of medical knowledge, the progress of scientific and technological progress, and military orders. Thus, the success of the chemical industry led to the emergence of plastic dummies, the progress of computer technology predetermined the creation of virtual simulators and patient simulators. Many modern projects to create simulators were of applied military importance and were funded by the defense departments.

At present, little is known about medieval medical simulators, and the first documentary evidence and products that have survived to this day were French generic phantoms of the 18th century.

Angélique de Cudray (Angélique Marguerite Le Boursier du Coudray, 1712-1789), who went down in history as Madame du Coudray, came up with her own method of simulation training of midwives using a phantom.

According to her sketches, the "Machine" was made for demonstrating and working out the birth aid, subsequently famous throughout Europe. In 1758 it was approved by the French Academy of Surgeons as a teaching aid [3,5].

The birthing simulator was a complex device and cost as much as 300 livres - it was made of cotton and leather straps, for added realism, the pelvic ring was formed using human bones inserted into it. By changing the tension of the leather belts, it was possible to simulate difficult childbirth with obstructed patency of the birth canal. When the machine was shown to the French king Louis XV, he was so impressed by the obvious practical value of the product that he commanded Angelique du Coudray to train midwives

throughout France. "Angelica and the King" rendered a great service to France - for 25 years of educational activity, Madame du Coudray managed to train about 5 thousand midwives and over 500 surgeons. Her merits were appreciated by France, and in her old age she received a pension from the state in the amount of 3 thousand livres.

Subsequently, other industrial powers began to pay attention to the training of doctors and paramedical personnel with the help of phantoms and dummies. So, independently of Madame du Coudray, a similar birth simulator was invented by the British obstetrician Smellie (the one who first measured the diagonal conjugate of the pelvis, designed craniotomy scissors and curved forceps with an “English” lock, and developed the “Smellie technique” with a breech presentation of the fetus). Similar products of the late 19th - early 20th centuries, made in Germany, England, Japan, have survived to this day - primarily intended for studying anatomy and practicing nursing skills.

THE CHRONOLOGY OF THE INVENTION OF SIMULATORS:

1957 - Fundamentals of cardiopulmonary resuscitation (ABC principle). Peter Safar, USA d.- CPR training dummy Resusci Anne. Asmund Laerdal, Norway

1963 Standardized patient technique. University of Southern California, USA

1965 Anesthesiology computer simulator Sim 1. Abrahamson, USA

1968 Harvey cardiac simulator. Michael Gordon, USA

1986 Anesthesia simulator CASE-Eagle. David Gaba, USA

1988 Anesthesia simulator GAS. J. Gravenstein, USA

1993 TouchSense haptic feedback technology. Immersion, USA

1993 The concept of virtual training in surgery. Richard Satava, USA

1994 Project Visible Human. Michael Ackerman, USA

1994 European Society for Simulation in Medicine SESAM established

1996 Virtual simulator of minimally invasive surgery MIST. Rory McCloy, UK

1996 KISMET virtual laparoscopy simulator. Uwe Kuhnapfel, Germany

1997 HATS Abdominal Injury Surgical Treatment Simulator. DARPA /HT Medical, USA

1997 Virtual simulator of ultrasonic diagnostics UltraSim. MedSim, Israel

1999 Virtual simulator of endoscopy PreOp Endoscopy. HT Medical, USA

1999 Virtual Angiography and Endovascular Surgery Simulator PreOp Endovascular. HT Medical, USA

1999. Pediatric patient simulator PediaSim. METI USA

2000 LapSim Surgical Science Laparoscopy Simulator Sweden

2000 SimMan Patient Simulator. Laerdal, Norway

2001 ECS Patient Simulator. METI, USA

2001 Virtual Eye Surgery Simulator EYE-SI.Vrmagic, Germany

2010 Complex Simulation Platform OR-camp.Orzone, Sweden

2012 Russian Society for Simulation Education in Medicine, ROSOMED.

During the first decade of the 21st century, virtual simulators were designed for dentistry, neurosurgery, orthopedics, arthroscopy, surgery for eye and ENT diseases. Now it is difficult to name a specialty in which there would not be a virtual simulator for practicing this or that manipulation, intervention [1,5].

Today, hundreds of robotic simulators and thousands of mannequins enter the army of virtual patients every year and go "for treatment" to simulation centers around the world.

Since 2007, the US Senate has passed the State Funding for the Development of Simulation Technologies in Medical Education three times.

In Europe, at the founding congress (1994 in Copenhagen), the European Society for Simulation Applied Medicine (SESAM) (Society in Europe for Simulation Applied to Medicine) was created, which holds authoritative conferences. Later, the international Society for Simulation in Healthcare (SSIH) was created, headquartered in Minneapolis, USA, which also holds annual conferences on simulation training.

The main mission of SESAM is to create a sustainable interprofessional community of practitioners across Europe that seeks to expand knowledge, improve quality and expand access to health care modeling.

SESAM's vision is to improve healthcare through simulation. Ensuring safe, patient-centered care delivered by competent and confident health professionals within a well-functioning health system.

To date, the Russian healthcare system has also realized the relevance of a similar system; in 2012, the Russian Society for Simulation Education in Medicine, ROSOMED, was created.

ROSOMED promotes the introduction of simulation

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technologies into medical education and practical healthcare to acquire skills and abilities, conduct certification and attestation, perform scientific research and test medical equipment and technologies without risk to patients.

ROSOMED is a community of like-minded people, enthusiasts of simulation technologies in medical education. The Society brings together specialists in this industry: teachers and instructors of simulation training; heads of training centers; researchers involved in this area of modern educational science; developers, manufacturers and suppliers of educational and methodical simulation equipment.

Simulation training is an efficient and effective tool for solving certain problems. In order for these (expensive) technologies to bring maximum benefit, it is necessary to clearly define their advantages and disadvantages, and then set goals and formulate tasks that are impossible or impractical to solve without these technologies.

McGaghy (1999) describes a simulation as “a person, device, or set of conditions that authentically recreates the actual problem. The student or trainee must respond to the situation that has arisen in the same way as he would do in real life.

David Gaba (2004) of Stanford University has proposed a more detailed definition of this term, according to which simulation is “a technique (not a technology) that allows you to replace or enrich the practical experience of the trainee with an artificially created situation that reflects and reproduces the problems that take place in the real world, in a fully interactive manner."

Drs. Nicolas Maran and Ronnie Glavin (2003) of the Scottish Clinical Simulation Center have described simulation as "an educational technique that involves an interactive, 'immersive' activity by recreating a real clinical picture in whole or in part, without any associated risk to the patient." Currently, there are dozens of various simulation centers operating in the world, which differ significantly from each other in size, specialization, staffing, equipment, number and contingent of trainees, level of subordination and form of ownership.

The Decree of the President of the Republic of Uzbekistan dated May 6, 2019 NoPP-4310 “On measures for the further development of the system of medical and pharmaceutical education and science” provided for the organization of training and simulation centers. On the basis of this Decree, on June 21, 2019, the Tashkent Medical Academy opened the Training and Simulation Center, equipped with the latest equipment that meets international requirements and is aimed at improving the practical experience and qualifications of students. This center was organized within the framework of the grant project "Improving the educational process using innovative technologies" for a total amount of 200,000 US dollars, allocated by the Ministry of Higher and Secondary Specialized Education of Uzbekistan and the "Innovation Fund" of the World Bank.

From the 2021-2022 academic year, a department of simulation training was created on the basis of the training and simulation center. In January of the current year, on the basis of an agreement with Sintomed LLC represented by D.V. , which is a system integrator of education in medicine” (ROSOMED), practical classes were organized for the staff of the department under the program “Training trainers for simulation training in medicine”. The simulation training system provides for maximum approximation to the real working conditions of a doctor. The use of different types of mannequins (simulator mannequins, mannequins patient simulators, high-tech dummies such as patient analogues) for each specific training task can significantly increase the efficiency of mastering practical skills. At the same time, simulation training is not a panacea and in no way replaces bedside training - both technologies in the modern educational process should organically complement each other. The creation of a wide arsenal of simulators that imitate opportunities for practical actions close to natural conditions, computer simulation of all kinds of clinical situations in the dynamics of their development opens up new horizons for practical training, advanced training and assessment of its level among students. After completing a bachelor's degree course, a general practitioner must have the ability and ability to make a diagnosis based on a diagnostic study, in accordance with the algorithm and taking into account the International Classification of Diseases. A general practitioner should be able to perform basic therapeutic measures for diseases of the internal organs among patients of various age groups, as well as carry out preventive measures to improve and maintain health, and promote a healthy lifestyle. All this is facilitated by the passage of a simulation course on the basis of the department. In addition to the simulation course, clinical residents and masters have the opportunity to consolidate their skills directly on patients receiving treatment at the clinical bases of the Tashkent Medical Academy. The quality of medical care to the population directly depends not only on theoretical training, but also on the development of practical skills by doc-

tors. Like first-graders, students of medical universities in their first years of study form their own individual handwriting in their work. The capital notebook at this stage is the simulation course, which students take on the basis of the Department of Simulation Education of the TMA.

The active introduction of modern medical technologies into healthcare practice, the increasing requirements for the professional competence of medical workers determine the need to strengthen the practical aspect of training specialists. High risks of complications when performing medical manipulations, legal and ethical restrictions make simulation learning technologies one of the most important in the teaching process at a medical university.

Three paths lead us to the heights of wisdom: the path of reflection - the most noble, the path of imitation - the most accessible of all others, and the bitter path - on our own mistakes.

(Confucius, 5th century BC).

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